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MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR

1915

JOHN McLEISK, B.A.

MINES BRANCH
DEPARTMENT OF MINES
OTTAWA

1917

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HON. P. E. BLONDIN, MINISTER; R. G. McCONNELL, DEPUTY MINISTER.

(MINES BRANCH)

EUGENE HAANEL, PH.D., DIRECTOR.

ANNUAL REPORT

ON THE

MINERAL PRODUCTION OF CANADA

During the Calendar Year

1915

JOHN McLEISH, B.A.

Chief of the Division of Mineral Resources and Statistics.




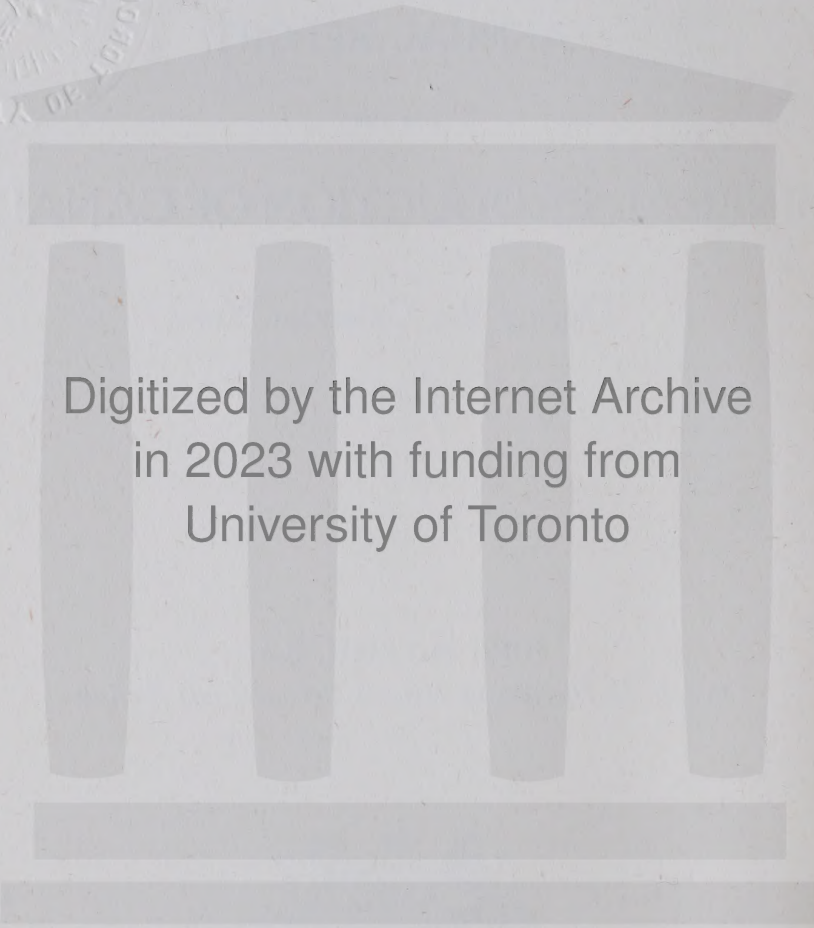
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LETTER OF TRANSMITTAL.

DR. EUGENE HAANEL,
Director of Mines,
Department of Mines, Ottawa.

SIR,—I beg to hand you, herewith, the Annual Report on the Mineral Production of Canada, giving revised statistical information descriptive of the mining and metallurgical production in Canada during the calendar year 1915.

A preliminary report on the mineral production during 1915 was sent to press February 21, 1916, and issued within the following week.

Parts of the present report—including "General Summary of the Mineral Production of Canada during the Calendar Year 1915," "Report on the Production of Iron and Steel in Canada during 1915," "Report on the Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and Other Metals, in Canada, during 1915," "Report on the Production of Coal and Coke in Canada, during 1915," and "Report on the Production of Cement, Lime, Clay Products, Stone, and Other Structural Materials in Canada, during 1915," have already been separately published.

In the preparation of this Report, Mr. A. Buisson has again contributed largely to the compilation of the special chapters on gold, silver, copper, lead, nickel, zinc, and miscellaneous metallic minerals. Mr. J. Casey has, as usual, given particular care to the compilation of the statistical tables.

Grateful acknowledgment is made of the hearty co-operation of mine and smelter operators who have almost without exception cheerfully complied with our requests, and furnished the department with statistics and information regarding their operations.

I have the honour to be, Sir,
Your obedient servant,
John McLeish.

DIVISION OF MINERAL RESOURCES AND STATISTICS,
September 21, 1916.

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EXPLANATORY NOTES.

The term "ton" used throughout this report signifies a ton of 2,000 pounds; while the year referred to means calendar year, unless otherwise stated. The Government fiscal year formerly ended on the 30th of June; but now terminates on the 31st of March. This change took place in 1907, hence the fiscal period ending March 31, 1907, covers only nine months.

Statistics of exports and imports given throughout this report are compiled from the reports of Trade and Navigation, published by the Customs Department.

The term "production" used throughout this report may in general be interpreted as meaning the quantity sold or shipped. Mineral products mined or manufactured, but not sold or shipped, at the end of the year, are not included as "production." An exception to this usage will be found in reference to pig-iron, in which case the statistics of production represent the quantities made.

The value of the metallic minerals produced, whether refined in Canada or not, is calculated on the basis of the average price of the metal in some recognized market. New York prices have usually been taken as the standard, except in the case of lead, however, for which the Montreal price is now used. The value of non-metallic products is given as at the mine or point of shipment.

THE MINERAL PRODUCTION OF CANADA

During the Calendar Year

1915

General Summary

The term "mineral production" is so comprehensive that there is a wide divergence in methods both in the compilation of quantities of mineral products, and in the adoption of a basis of valuation. Such methods have been the subject of discussion in previous reports which need not be repeated at this time.

It was briefly stated in our preliminary report issued on March 1st, that the metal mining industry had in 1915, as a result of the demand created by the war, shown the highest production ever recorded and that the total value of the mineral production of Canada, had, notwithstanding the greatly decreased production of materials of construction, such as cement, clay and stone quarry products, etc., shown a very large increase over the production of the previous year.

Although military requirements caused restrictions to be placed upon the export of many mineral products, the mining industry suffered no serious loss in respect thereto. Producers were enabled in almost every instance to secure permits for exportation to approved destinations, the restriction serving chiefly as a means to enable the government to control the marketing outside of Canada of products that might be useful to the enemy.

The total value¹ of the metal and mineral production in 1915 was \$137,109,171, compared with \$128,863,075 in 1914, and \$145,634,812 in 1913, the latter being the highest production recorded. The increase in 1915 over 1914 was thus \$8,246,096, or 6.4 per cent, but the output is still less than that in 1913 by \$8,525,641.

The record of annual mineral production in Canada since 1886, shown in the following table, indicates the rapid growth which the mineral industry has made.

¹ In presenting a total valuation of the mineral production as is here given, it should be explained that the production of the metals copper, gold, lead, nickel, and silver is given as far as possible on the basis of the quantities of metals recovered in smelters, and the total quantities in each case are valued at the average market price of the refined metal in a recognized market. There is thus included in some cases the values that have accrued in the smelting or refining of metals outside of Canada.

The total value of the production in 1886 was \$10,221,255, or about \$2.23 per capita. In ten years the value had increased to \$22,474,256, or \$4.38 per capita, more than twice the total in 1886, and nearly twice the production per capita. The next ten years witnessed an increase to \$79,286,697 in 1906, or \$12.81 per capita, about $3\frac{1}{2}$ times the production in 1896. From 1906 to 1913 the total production showed an increase of over 80 per cent with an increase of nearly 50 per cent in production per capita. The decrease of 1914 has been more than half made up by the increase of 1915.

Annual Mineral Production in Canada since 1886.

Year.	Value of production.	Value per capita.	Year.	Value of production.	Value per capita.
1886.....	\$10,221,255	\$ 2.23	1901.....	\$65,797,911	\$12.16
1887.....	10,321,331	2.23	1902.....	63,231,836	11.36
1888.....	12,518,894	2.67	1903.....	61,740,513	10.83
1889.....	14,013,113	2.96	1904.....	60,082,771	10.27
1890.....	16,763,353	3.50	1905.....	69,078,999	11.49
1891.....	18,976,616	3.92	1906.....	79,286,697	12.81
1892.....	16,623,415	3.39	1907.....	86,865,202	13.75
1893.....	20,035,082	4.04	1908.....	85,557,101	13.16
1894.....	19,931,158	3.98	1909.....	91,831,441	13.70
1895.....	20,505,917	4.05	1910.....	106,823,623	14.93
1896.....	22,474,256	4.38	1911.....	103,220,994	14.42
1897.....	28,485,023	5.49	1912.....	135,048,296	18.27
1898.....	38,412,431	7.32	1913.....	145,634,812	18.77
1899.....	49,234,005	9.27	1914.....	128,863,075	15.96
1900.....	64,420,877	12.04	1915.....	137,109,171	

The detailed comparative statement here presented shows the production of each important product during the past two years, the production which each contributes to the total production, and the increase or decrease as the case may be of the production in 1915, as compared with that of 1914.

Although the grand total shows a substantial increase it will be noted that 28 items in the table show a decreased production aggregating \$12,381,915, whereas 29 items show increases aggregating \$20,628,011, the net result being an increase of \$8,246,096. The principal increases were in the metals and metalliferous ores and the principal decreases in cement, clay and quarry products. Among the non-metalliferous ores there was comparatively little change, the total increases being \$1,728,027 and the total decreases \$1,821,685, or a net decrease of \$93,658.

The total value of the metallic production in 1915 was \$75,814,841, as against \$59,386,619 in 1914, an increase of \$16,428,222 or over 27 per cent. With a practically unlimited demand and high prices there was an increased production of all metals with the notable exception of silver in which there was a falling off both in price and production. Notwithstanding these important increases however, it was only in the case of nickel and copper among the more important metals that the production in 1915 exceeded the maximum of previous years.

Comparative Statement of Mineral Production for Years 1914 and 1915—Continued.

Product.	1914.			1915.			Increase (+) or Decrease (-).		Increase (+) or Decrease (-).	
	Quantity.	Value (a).	Per cent of total.	Quantity.	Value (a).	Per cent of total.	Quantity.	%	Value.	%
<i>Non-metallic.</i>										
Actinolite.....	119	\$ 1,304	.....	220	\$ 2,420	.....	101	84.87	\$ 1,116	85.58
Asbestos oxide.....	1,737	104,015	.....08	2,396	147,830	.....	659	37.94	43,815	42.12
Asbestos.....	96,542	2,892,266	2.22	111,142	3,553,166	2.59	14,600	15.12	660,900	22.85
Asbestia.....	21,031	17,540	.....	25,700	21,819	.....	4,669	22.20	4,279	24.50
Chromite.....	136	1,210	.....	12,341	179,543	.....	12,205	.....	178,333	.....
Coal.....	13,637,529	33,471,801	25.97	13,267,023	32,111,182	23.42	370,506	2.72	1,360,619	4.06
Corundum.....	548	72,176	.....05	262	33,138	.....	286	52.19	39,038	54.09
Feldspar.....	18,060	70,824	.....05	14,559	57,801	.....	3,501	19.39	13,023	18.39
Graphite.....	1,647	107,203	.....08	2,635	124,223	.....	988	59.99	17,020	15.89
Graphite, artificial.....	617	54,504	.....04	249	.....	.....	368	59.64	.....	.....
Grindstones.....	3,976	1,156,207	.....89	2,580	35,768	.....	1,396	35.11	18,736	34.38
Gypsum.....	516,880	2,240	.....	474,815	854,929	0.62	72,065	13.94	301,278	26.06
Magnesite.....	358	2,479	.....	14,779	126,584	.....	14,421	.....	124,344	.....
Manganese.....	28	1,120	.....08	201	9,360	.....	173	.....	8,240	.....
Mica.....	.....	109,061	.....	.....	91,905	.....	.....	.....	17,156	15.73
<i>Mineral pigments—</i>										
Barytes.....	612	6,169	.....	550	6,875	.....	62	10.13	706	11.44
Ochres.....	5,890	51,725	.....04	6,248	48,353	.....	358	6.08	3,372	6.52
Mineral water.....	.....	134,111	.....10	.....	115,274	.....	.....	.....	18,837	14.05
Natural gas (g).	21,692,504	3,484,727	2.70	20,124,162	3,706,035	2.70	1,568,342	7.23	221,308	6.35
Peat.....	685	2,470	.....	300	1,050	.....	385	56.20	1,420	57.49
Petroleum.....	214,805	343,124	.....28	215,464	300,572	0.22	659	0.31	42,552	12.40
Phosphate.....	954	7,275	.....	217	2,502	.....	737	77.25	4,773	65.61
Pyrites.....	228,314	744,508	.....57	286,038	985,190	0.72	57,724	25.28	240,682	32.38
Quartz.....	54,148	84,583	.....06	127,108	205,153	0.15	72,960	134.74	120,370	142.58
Salt.....	107,038	493,648	.....38	119,900	600,226	0.44	12,862	12.02	106,378	21.59
Talc.....	10,808	40,418	.....03	11,885	40,554	.....	1,077	9.87	330	0.33
Tripolite.....	650	13,000	.....	317	12,119	.....	333	51.23	881	6.78
Total.....	.....	43,467,229	33.72	.....	43,373,571	31.63	.....	.....	93,658	0.22

Structural Materials and Clay Products.

Cement, Portland..... Bls.	7,172,480	\$9,187,924	7-13	5,681,032	\$6,977,024	5-09	- 1,491,448	20-8	-\$2,210,900	24-1
Clay products—										
Brick, common..... No.	457,513,762	3,653,861	2-83	234,732,882	1,755,187	1-28	-222,780,880	48-69	- 1,898,674	51-96
Brick, pressed..... No.	93,634,858	1,115,556	.80	49,817,160	492,774	0-36	-43,817,668	46-80	- 622,782	55-83
Brick, paving..... "	2,707,000	49,627	.03	1,227,647	20,694	.....	- 1,479,353	54-63	- 28,933	58-30
Brick, moulded and ornamental..... "	1,554,496	23,592	.08	1,008,567	49,097	.....	- 545,829	35-11	- 25,505	108-10
Fireclay, and fireclay products.....	.....	107,568	.31	.....	110,693	.....	.....	.....	3,125	2-91
Fireproofing architectural terra-cotta.....	.....	405,543	.....	.....	253,401	.....	.....	.....	152,142	37-32
Kaolin..... Tons	1,000	10,000	.....	1,300	13,000	.....	+	300	3,000	80-00
Pottery.....	.....	35,371	.02	.....	64,900	.....	.....	.....	32,569	85-48
Sewerpipe..... No.	.....	1,104,499	.84	.....	799,446	0-58	.....	.....	305,053	21-62
Tile, drain..... No.	.....	366,340	.28	.....	335,296	0-26	.....	.....	11,054	21-62
Lime..... Bus.	7,028,582	1,360,628	1-05	5,047,244	1,015,702	0-74	.....	.....	34,956	28-10
Sand-lime brick..... No.	70,650,030	609,515	.47	17,960,802	141,742	.....	- 52,689,228	74-58	- 467,773	76-15
Sand and gravel.....	.....	2,505,310	1-94	6,445,717	1,624,767	1-19	.....	.....	880,543	35-15
Slate..... Squares	1,075	4,837	.....	397	2,039	.....	-	678	- 2,798	57-84
Stone—										
Granite.....	.....	2,176,602	1-69	.....	1,535,553	1-11	.....	.....	651,049	29-91
Limestone.....	.....	2,672,781	2-08	.....	2,342,081	1-60	.....	.....	360,700	13-50
Marble.....	.....	132,533	.10	.....	138,027	0-12	.....	.....	25,494	19-24
Sandstone.....	.....	487,140	.38	.....	249,336	0-18	.....	.....	237,804	48-82
Total.....		26,009,227	20-03	.....	17,920,759	13-07	.....	.....	- 8,088,468	31-1
Grand total.....		128,863,075	100-00	.....	137,109,171	100-00	.....	.....	+ 8,246,096	6-40

*Short tons throughout. (a) The metals copper, lead, nickel and silver are for statistical and comparative purposes valued at the final average value of the refined metal. Pig-iron, zinc ore, and cobalt oxides are valued at the furnace or spot, and non-metallic products at the mine or point of shipment. (b) Copper content of smelter products and estimated recoveries from ores exported, at 17-275 cents per pound, in 1915, and 13-602 cents per pound in 1914. (c) The total production of pig-iron in Canada in 1915 was 913,775 tons valued at \$11,374,199, of which it is estimated 755,180 tons valued at \$9,658,325 should be credited to imported ores; in 1914 the total production was 783,164 tons valued at \$10,002,856, of which 687,420 tons valued at \$8,863,944 are credited to imported ores. (d) Refined lead and lead contained in base bullion exported at 5-600 cents per pound in 1915, and 4-479 cents in 1914. (e) Increasing quantities of nickel-copper matte are now being used in making monel metal covered from silver-cobalt-nickel ores valued at 30 cents in 1915 and 1914. (f) The value of the nickel contained in matte, as returned by the operators, was from 10 to 15 cents per pound for both years. (g) Silver recovered in bullion and recoverable from ores and smelter products exported at 49-684 cents per ounce in 1915, and at 54-811 cents in 1914. (h) Gross returns for sale of gas. (i) In 1915 and 1914 figures as reported by the producers, which differ slightly from those of the Trade and Navigation reports. (j) Included under cobalt in 1915. (m) Included under nickel in 1915.

Metal prices varied within wide limits during the year but with the exception of silver the average price for most metals was higher than the average for many years.

Metal Prices.

	1910.	1911.	1912.	1913.	1914.	1915.
	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
Antimony (ordinaries)..... Per lb.	7-386	7-540	7-760	7-520	8-763	30-280
Copper, New York..... "	12-738	12-376	16-341	15-269	13-602	17-275
Lead	4-446	4-420	4-471	4-370	3-862	4-673
London..... "	2-807	3-035	3-895	4-072	4-146	4-979
Montreal*..... "	3-246	3-480	4-467	4-659	4-479	5-600
Nickel, New York..... "	40-000	40-000	40-000	40-000	40-000	45-000
Silver..... Per oz.	53-486	53-304	60-835	59-791	54-811	49-684
Spelter..... Per lb.	5-520	5-758	6-943	5-648	5-213	13-230
Tin..... "	34-123	42-281	46-096	44-252	34-301	38-500

*Quotations furnished by Messrs. Thomas Robertson & Company, Montreal, Que.

The total value of the non-metalliferous production in 1915 was \$61,294,330 as against \$69,476,456 in 1914, a decrease of \$8,182,126 or 11.78 per cent.

The decrease was most pronounced in the case of materials of construction such as cement, clay products, lime, stone quarry products, etc. The total value of the production of structural materials in 1915 was \$17,920,759, as against \$26,009,227 in 1914, a decrease of \$8,088,468 or 31.1 per cent. Amongst the other products showing a falling off in production were coal, corundum, feldspar, grindstones, gypsum, mica, and petroleum, whilst the principal products showing an increase were arsenious oxide, asbestos, chromite, graphite, magnesite, pyrites, quartz, and salt.

Coal is still the most important mineral product in Canada in point of value, having constituted 23.4 per cent of the total in 1915. The metals came next in importance with nickel contributing 14.9 per cent, copper 13.8 per cent, gold 12.7 per cent, and silver 9.6 per cent. The production of cement made up 5.1 per cent of the total, clay products 2.9 per cent, stone quarries 3.1 per cent, natural gas 2.7 per cent, and asbestos 2.6 per cent.

The production of pig-iron given in the general table includes only that proportion of the output of Canadian blast furnaces credited to Canadian ores. There is an important production of pig-iron from imported ores (shown in the footnotes of the general table, and in the chapter on iron and steel) and the total value thereof in 1915 was exceeded only by the production of coal, gold, silver, copper and nickel. There is also a large production of aluminium from imported ores, for which no value is included in the general table of production.

EXPORTS AND IMPORTS.

A very large portion of the mineral production of Canada is exported for consumption or refining outside of Canada. On the other hand considerable quantities of mine products, chiefly those which have been refined or subjected to partial treatment, or in the form of manufactured goods ready for consumption, are imported.

The total value of the exports of products of the mine, including direct mine products and manufactures thereof, in 1915 was \$124,157,761, compared with \$75,533,305 in 1914. This value includes for 1915 mine products to the value of \$61,814,582 and manufactures valued at \$62,343,179, as against mine products valued at \$53,781,102, and manufactures valued at \$21,752,203 in 1914.

Practically the whole of the Canadian production of copper, nickel, and silver is exported, also a very large proportion of the production of gold, asbestos, and mica. There are, as well, considerable exports of coal. These products alone contribute about 93 per cent of the value of the mine products exported. Manufactured products exported consist chiefly of iron and steel goods, agricultural implements, aluminium, calcium carbide, acetate of lime, fertilizers, and coke.

The United States is the chief destination of Canada's mine exports, about 72 per cent having been exported to that country during the fiscal year 1914-1915, and about 25 per cent to the United Kingdom.

The principal increases in exports of mine products in 1915 were in coal, copper, gold, lead, nickel, antimony, and pyrites. The exports of manufactured mine products were almost three times the total of similar exports in 1914.

The principal increases were in iron and steel goods, the total value of iron and steel exports in 1915 being \$48,268,148, as against \$14,391,746 in 1914. There were also, however, important increases in the export of aluminium, ferro-alloys, brass, and calcium carbide.

A great variety of mineral products chiefly in a manufactured or semi-manufactured condition are annually imported into Canada, these imports having increased with great rapidity during the ten years preceding 1913. During the past two years, however, there has been a falling off of 19.4 per cent. The total value of such imports during the calendar year 1915 was \$146,323,500, as compared with imports valued at \$181,675,667 in 1914; \$259,299,745 in 1913; \$238,212,835 in 1912; \$181,773,708 in 1911, and \$147,305,012 in 1910.

Of the total imports in 1915 about \$35,000,000 was made up of the cruder forms of mineral products such as coal, diamonds unset and bort, iron ore, asphaltum, ores of metals, alumina, sand and gravel, etc., as against \$46,000,000 for similar products in 1914.

The imports of iron and steel in 1915 included in this table, (see page 21), were valued at \$74,308,983, as against \$80,063,679 in 1914. Imports of the metals aluminium, antimony, copper, gold, silver, lead, platinum, tin, and zinc, and manufactures thereof, and metallic alloys, reached a total value of over \$17,000,000 as compared with a value of over \$30,000,000 in 1914; petroleum and products of, \$7,979,264, as against \$11,072,362 in 1914; clays and clay products \$2,998,465, as against \$4,467,140.

EXPORTS.

Exports of the Products of the Mine and of Manufactures of Mine Products—Calendar Years 1914 and 1915.

	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
MINE PRODUCTS.				
Arsenic..... Lbs.	3,751,900	\$ 132,567	4,636,400	\$ 174,190
Asbestos..... Tons	81,081	2,298,646	84,584	2,734,695
Asbestos sand..... "	18,991	108,548	25,103	157,410
Chromite..... "			7,290	81,838
Coal..... "	1,423,126	3,880,175	1,766,543	5,406,058
Copper, fine in ore, etc..... Lbs.	68,830,059	7,130,778	81,437,063	8,671,641
" black or coarse and in pigs..... "	6,581,564	908,201	21,292,516	3,788,715
Feldspar, magnesite and talc..... Tons	(a) 18,072	74,100		148,915
Gold..... \$		15,242,200		16,528,143
Gypsum, crude..... Tons	345,830	404,234	292,234	336,380
Lead, in ore, etc..... Lbs.	246,100	2,681	1,845,100	40,273
Lead, pig, etc..... "	510,573	19,507	2,066,929	79,067
Mica..... "	669,163	178,940	879,631	236,124
Mineral pigments..... "	3,554,900	22,311	2,391,600	17,263
Mineral water..... Gals.	2,287	599	198	53
Nickel, in ore, etc..... Lbs.	46,528,327	5,149,427	66,410,442	7,394,446
Oil, mineral, crude, etc..... Gals.	3,996	362	35,977	1,789
Oil, refined..... "	3,922	826	103,488	14,107
Ores—				
Antimony..... Tons			1,149	82,990
Corundum..... "	947	87,740	339	37,798
Iron..... "	135,451	360,974	79,770	206,823
Manganese..... "	30	750	255	6,855
Other ores..... "	12,770	782,437	23,816	798,214
Phosphates..... "	247	677	179	1,860
Platinum..... Ozs.	43	2,161	236	11,052
Plumbago, crude ore, etc..... Cwt.	18,375	50,528	5,254	12,009
Pyrites..... Tons	89,999	377,985	137,598	527,318
Salt..... Cwt.	9,527	5,229	8,893	5,836
Sand and gravel..... Tons	952,370	802,358	808,022	380,549
Silver..... Ozs.	28,020,089	15,584,813	27,672,481	13,812,038
Stone, building..... Tons	63,009	46,198	35,804	28,910
" ornamental..... "	231	5,607	29,976	12,764
" crushed..... "	25,130	18,153	42,716	24,453
" for manufacture of grindstones..... "	54	294	180	900
Other products of the mine.....		101,096		53,106
Total mine products.....		53,781,102		61,814,582

(a) Feldspar only in 1914.

Exports of the Products of the Mine and of Manufactures of Mine Products—Calendar Years 1914 and 1915.—Continued.

	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
MANUFACTURES				
Acetate of lime.....Lbs.	16,052,255	\$ 282,146	10,001,830	\$ 205,748
Acid, sulphuric....."	7,485,509	45,612	19,270,572	243,457
Agricultural implements:—				
Cultivators.....No.	6,030	146,668	5,957	166,602
Drills....."	3,961	259,701	6,400	422,772
Harrows....."	6,252	92,556	4,459	81,731
Harvesters and binders....."	19,474	2,015,996	7,668	809,141
Hay rakes....."	6,524	196,519	1,758	40,289
Mowing machines....."	21,457	725,831	5,031	175,912
Parts of....."		712,414		519,379
Ploughs.....No.	12,896	324,349	14,923	309,286
Reapers....."	3,919	223,228	471	21,105
Seeders....."	32	1,810	2	87
Threshing machines....."	1,965	799,307	1,001	568,401
All other....."		290,520		302,355
Aluminium, in bars.....Cwt.	145,108	2,364,907	186,808	3,333,726
" manufactures of....."		5,571		620,562
Asbestos, manufactures of....."		94,538		125,003
Bricks.....M	1,486	11,871	1,155	9,089
Calcium carbide.....Lbs.	15,447,014	470,387	102,017,471	3,160,950
Cement....."		2,223		5,161
Clay, manufactures of....."		26,866		25,202
Coke.....Tons	67,838	306,117	35,869	160,053
Earthenware, and all manufactures of....."		9,336		11,281
Fertilizers....."		2,390,494		2,335,297
Grindstones, manufactured....."		24,113		35,334
Gypsum and plaster ground....."		35,490		80,933
Iron and steel:—				
Castings, n.e.s....."		24,218		143,714
Ferro-silicon and ferro compounds.....Tons	4,865	285,221	9,238	537,081
Gas buoys and parts of....."		21,009		2,017
Hardware, tools, etc....."		95,497		321,021
" n.e.s....."		190,763		401,053
Machinery (Linotype machines)....."		5,562		6,946
" n.e.s....."		344,689		536,162
Pig-iron.....Tons	14,198	201,145	17,307	231,551
Scrap iron and steel.....Cwt.	708,107	446,337	1,787,155	883,134
Sewing machines.....No.	2,109	31,392	2,557	30,479
Steel and manufactures of, all other....."		2,931,908		31,147,770
Stoves.....No.	4,198	25,149	1,271	18,563
Typewriters....."	3,055	200,441	3,175	206,811
Vehicles:—				
Automobiles....."	5,621	3,011,327	13,475	6,756,395
" parts of....."		384,428		363,178
Bicycles.....No.	111	10,021	116	4,692
" parts of....."		3,973		15,447
Washing machines....."		33,986		20,334
Wire and wire nails.....Cwt.	193,255	355,781	1,439,950	3,224,740
Lime....."		16,927		15,617
Metals:—				
Brass, old and scrap.....Cwt.	21,209	196,710	120,685	1,468,165
Copper....."	19,871	231,710	41,616	616,553
Metallic shingles, etc....."		105,663		66,655
Metals, n.o.p....."		393,829		878,258
Mineral and aerated waters (in bottles)....."		1,768		3,525
Naphtha and gasoline.....Gals.	43,023	11,607	16,644	4,540
Oil, n.o.p....."	455,867	104,179	1,247,376	290,943
Phosphorus.....Lbs.	610,350	92,303	545,050	77,476
Plumbago, manufactures of....."		72,718		84,316
Stone, building....."		370		660
" ornamental....."		1,752		5,990
Tar....."		36,719		37,331
Tin, manufactures of....."		24,531		173,206
Total manufactures.....\$		21,752,203		62,343,179
Grand total.....\$		75,533,305		124,157,761

EXPORTS.

Showing Destination of Mine Products during the Fiscal Years,
1912-1913, 1913-1914, and 1914-1915.

Destination.	1912-13. Value.	1913-14. Value.	1914-15. Value.
<i>British Empire.</i>			
United Kingdom.....	\$ 12,066,622	\$ 16,027,128	\$ 12,219,937
Australia and Tasmania.....	73,283	92,457	125,903
Bermuda.....	5,315	1,192	.....
British South Africa.....	33,415	13,863	8,092
" Guiana.....	37,983	23,351	.....
" India.....	.....	.....	612
" E. Indies, other.....	.....	.....	4,404
" W. Indies.....	15,383	3,343	1,552
Gibraltar.....	.....	.....	1,974
Hong Kong.....	491,121	1,058,229	213,254
Newfoundland and Labrador.....	498,989	649,682	516,756
New Zealand.....	948	.....	130
Total British Empire.....	13,223,059	17,869,245	13,092,614
<i>Other Countries</i>			
Alaska.....	327,325	102,383	243,231
Argentina.....	66,315	19,206	3,447
Austria-Hungary.....	32,474	74,200	37,124
Belgium.....	141,924	258,180	45,668
Brazil.....	54,760	.....	3,159
China.....	511,155	162,034	94,203
Cuba.....	8,852	19,253	1,461
Denmark.....	877	365	611
France.....	114,370	167,974	91,857
French Africa.....	2,127	.....	.....
Germany.....	172,966	618,201	290,276
Greece.....	.....	200	.....
Hawaii.....	.....	.....	26,262
Hayti.....	843	.....	.....
Holland.....	27,529	185,158	87,207
Italy.....	7,430	16,704	41,353
Japan.....	54,976	32,626	69,483
Mexico.....	69,946	.....	1,928
Miquelon and St. Pierre.....	47,093	20,476	36,519
Norway.....	.....	100	2,662
Panama.....	.....	.....	3,891
Philippines.....	.....	.....	5,257
Portugal.....	.....	1,322	633
Roumania.....	4,791	.....	.....
Russia in Europe.....	.....	140	2,678
Spain.....	.....	10	911
Sweden.....	.....	150	345
United States.....	42,541,751	39,491,127	37,558,209
Uruguay.....	31,983	.....	.....
Total other countries.....	44,219,487	41,169,809	38,648,375
Grand total.....	57,442,546	59,039,054	51,740,989

IMPORTS.

Imports of Products of the Mine and Manufactures of Mine Products
—Calendar Years 1913, 1914, and 1915.

Products.	1913. Value.	1914. Value.	1915. Value.
Alumina.....	\$ 614,713	\$ 571,419	\$ 892,634
Alum, alum cake, and chloralum.....	198,613	188,918	196,685
Aluminium and manufactures.....	745,694	860,351	722,235
Antimony regulus.....	49,408	47,498	344,918
Antimony salts.....	2,421	10,217	10,320
Arsenic, oxide and sulphide of.....	18,820	1,005	6,072
Asbestos.....	520,082	282,053	168,894
Asphaltum.....	905,829	712,980	570,295
Bells and gongs.....	130,351	99,898	43,205
Bismuth.....	4,940	3,927	9,004
Blanc fixe and satin white.....	38,043	39,849	59,471
Blast furnace slag.....	71,114	20,736	14,067
Borax.....	104,787	103,975	164,180
Brick and tile.....	1,928,735	1,296,657	488,288
Brick, fire, of a kind not made in Canada, and n.o.p.....	1,192,857	690,133	813,071
Bromine and bromides.....	385	997	530
Burrstones.....	1,784	16	314
Cement, Portland, and manufactures.....	427,032	159,691	47,836
Chalk, Cornwall stone, feldspar, fluorspar, etc.....	164,879	113,211	100,012
Clays.....	324,290	288,128	237,096
Coal: anthracite, bituminous, slack, and run-of-mine.....	47,949,119	39,801,498	28,345,605
Coal tar and coal pitch.....	225,765	198,283	151,377
Coke.....	2,180,830	1,585,259	1,608,464
Coke, ground for electric batteries.....	9,942	13,115	12,266
Copper and manufactures of.....	7,414,610	4,256,901	3,957,770
Cryolite.....	33,487	60,517	61,312
Crucibles, clay or plumbago.....	73,971	49,913	106,761
Chloride of lime.....	115,614	138,619	112,142
Cyanides of potassium, sodium, cyanogen, or cpd of bromine.....	217,472	309,913	367,329
Diamonds, unset, and bort.....	3,223,711	2,190,786	709,154
Earthenware.....	3,314,870	2,192,222	1,460,010
Earths, crude.....	9,527	3,992	1,811
Electric carbons.....	98,944	55,880	40,685
Emery.....	184,640	118,008	206,732
Fertilizers, compound or manufactured.....	505,904	677,174	734,952
Flint, quartz, silice, etc.....	74,529	63,433	54,493
Foundry facings.....	24,226	11,372	9,855
Fullers earth.....	13,190	12,338	12,321
Fossils.....	3,237	4,477	4,000
Gannister.....	1,776	595	2,462
Gold and silver and manufactures of.....	2,736,517	15,777,804	1,829,953
Graphite and manufactures of.....	82,262	50,279	45,117
Grindstones.....	145,247	98,872	79,391
Gypsum and plaster of Paris.....	188,252	75,031	25,819
Hydrofluosilicic acid.....	46,517	41,576	36,085
Iron and steel—Total, 1913, \$145,226,972 1914, 80,063,679 1915, 74,308,983			
Pig-iron.....	3,247,405	982,189	624,200
Ferro products and chrome steel.....	970,100	560,686	820,976
Ingots, blooms, billets, puddled bars, etc.....	1,212,314	259,703	1,270,687
Scrap iron and scrap steel.....	1,488,255	337,406	127,614
Plates and sheets.....	13,965,865	7,576,312	7,647,560
Tin plates and sheets.....	3,954,615	3,151,385	2,883,951
Bars, rods, hoops, bands, etc.....	10,195,280	5,138,193	5,829,088
Structural iron and steel.....	12,739,954	4,214,520	3,615,333
Rails and connexions.....	5,120,830	1,116,773	379,218
Pipes and fittings.....	847,922	395,466	110,978
Nails and spikes.....	360,489	210,098	86,876
Wire.....	3,688,660	3,205,635	2,175,834
Forging castings and manufactures.....	2,090,533	1,375,590	1,932,370
Other iron and steel products.....	85,344,750	51,238,306	46,804,298
Iron ore.....	3,877,824	2,387,358	2,331,755
Iron sand.....	10,168	13,743	3,263
Kalnite.....	1,970	13,337	146
Lead and manufactures; litharge.....	1,215,433	1,042,538	2,482,916
Lime.....	238,271	211,123	98,040
Lithographic stone.....	7,152	4,107	1,316
Manganese, oxide of.....	46,990	42,287	46,678

IMPORTS.

Imports of Products of the Mine and Manufactures of Mine Products
—Calendar Years 1913, 1914, and 1915.—*Continued.*

Products.	1913. Value.	1914. Value.	1915. Value.
Magnesia.....	\$ 12,226	\$ 16,429	\$ 9,695
Meerschäum.....	111	372	73
Mercury or quicksilver, cinnabar.....	109,493	97,449	159,284
Metallic alloys:—			
Babbitt metal.....	41,112	26,489	16,709
Brass and manufactures of.....	4,667,768	2,868,464	3,177,942
Britannia metal.....	43,417	33,080	11,198
German silver, nickel, and nickel silver.....	249,192	238,612	274,706
Type metal.....	1,981	1,500	1,838
Mineral and bituminous substances.....	198,519	146,763	123,726
Mineral water, including aerated water.....	257,153	199,327	126,569
Nickel anodes.....	8,512	12,640	9,571
Ochres, etc.....	283,554	278,064	284,749
Ores of metals, n.o.p., cobalt ore.....	894,989	574,690	962,999
Paraffin wax.....	72,351	57,527	40,965
Paraffin candles.....	37,546	44,874	27,552
Petroleum and products of.....	13,238,429	11,072,362	7,979,264
Phosphate (fertilizer).....	16,070	20,220	14,148
Platinum and manufactures of.....	145,674	79,614	84,087
Potash and manufactures of.....	414,165	343,004	211,243
Precious stones.....	360,473	177,168	132
Pumice.....	17,861	16,976	18,814
Salt.....	565,283	540,881	517,526
Saltpetre.....	81,797	108,784	279,692
Sand and gravel.....	440,343	224,759	120,756
Slate and manufactures of.....	235,474	213,256	108,676
Sand paper.....	171,516	138,415	133,677
Soda products: barilla, bichromate, caustic, sal, and salt cake.....	998,993	960,670	858,364
Stone and manufactures of (including marble).....	1,640,849	1,252,869	539,173
Soda, nitrate of.....	1,645,320	604,952	1,050,648
Sulphate of iron (copperas).....	5,036	5,517	5,302
Sulphur and phosphorus.....	638,970	877,628	509,889
Sulphuric acid.....	4,054	7,149	4,872
Talc.....	10,706	8,983	1,866
Tin and manufactures of (including tinware).....	3,118,760	2,023,329	1,654,796
Whiting and prepared chalk.....	151,380	134,511	109,551
Zinc and manufactures of.....	1,576,943	1,210,652	2,775,358
	259,299,745	181,675,667	146,323,500

METALLIC ORES AND PRODUCTS.

Antimony.—There was a production of antimony ore in 1915 (all exported) of 1,341 tons valued at \$81,283, and of refined antimony 59,440 pounds valued at \$11,888. There was no production during the three previous years. The imports of antimony or regulus thereof in 1915, were 1,962,194 pounds valued at \$344,918, and of antimony salts 67,956 pounds, valued at \$10,320, or a total value of imports of \$355,238. In 1914 the imports were antimony and regulus 648,516 pounds valued at \$47,498, and antimony salts 45,634 pounds, valued at \$10,217, or a total value of imports of \$57,715.

Cobalt.—Metallic cobalt, cobalt oxide, cobalt sulphate and other cobalt salts and alloys are produced in Ontario smelters. The production

in 1915 as metal or contained in cobalt oxide or other salt was equivalent to 504,212 pounds of cobalt and was valued at \$536,268. This included 211,610 pounds of metallic cobalt and 423,717 pounds of cobalt oxide and cobalt sulphate. In 1914 the production was reported as 899,027 pounds of cobalt oxide and 242,572 pounds of cobalt contained in residues sold outside of Canada or equivalent to a total of 871,891 pounds of cobalt.

Copper.—The production of copper contained in blister, matte, or ore, which was practically all exported, was 100,785,150 pounds in 1915, valued at \$17,410,635, as compared with 75,735,960 pounds in 1914, valued at \$10,301,606.

The exports of copper in 1915 were reported as 106,891,179 pounds, valued at \$13,076,909, as against exports in 1914 of 77,398,723 pounds, valued at \$8,270,689. The total imports of copper in 1915 were valued at \$3,957,770, and included crude and manufactured copper 19,497,500 pounds, valued at \$3,402,922, and other manufactures of copper valued at \$554,848.

The total imports of copper in 1914 were valued at \$4,256,901, and included crude and manufactured copper, 26,280,815 pounds valued at \$3,983,322, and other manufactures of copper, valued at \$273,579.

Gold.—The total value of the production of gold in 1915 was \$18,977,901, representing 918,056 fine ounces, as compared with \$15,983,007, representing 773,178 fine ounces of metal in 1914.

The Yukon placer production in 1915 was 229,803 fine ounces, valued at \$4,750,450.

Of the total production in 1915 about \$5,524,476 were derived from alluvial workings; \$8,909,170 in bullion from milling ores and \$4,544,255 from ores and concentrates sent to smelters.

In 1914 about \$5,687,501 were derived from alluvial workings; \$6,051,968 in bullion from milling ores, and \$4,243,538 from ores and concentrates sent to smelters.

The exports of gold-bearing dust, quartz, nuggets, and gold in ore, etc., in 1915, were valued at \$16,528,143, as against \$15,242,200 in 1914.

The imports of gold bullion during the calendar year 1915 were \$1,028,405, of gold coin \$19,910,229, and of manufactures of gold and silver \$464,294.

Pig-Iron.—The total production of pig-iron in Canadian blast furnaces in 1915 was 913,775 tons valued at \$11,374,199, of which it is estimated 755,180 tons valued at \$9,658,325 should be credited to imported ores, and 158,575 tons, valued at \$1,715,874 to domestic ores. In 1914 the total production was 783,164 tons, valued at \$10,002,856, of which it is estimated that 687,420 tons, valued at \$8,863,944, should be credited to imported ores, and 95,744 tons, valued at \$1,138,912 to domestic ores.

The exports of pig-iron in 1915 were 17,307 tons, valued at \$231,551, and of ferro-alloys 9,238 tons, valued at \$537,081, or a total of 26,545 tons, valued at \$768,632, as against total exports in 1914 of 19,063 tons, valued at \$486,366.

The imports of pig-iron in 1915 were 47,482 tons, valued at \$624,200; ferro-manganese, etc., 13,758 tons, valued at \$807,312, as compared with imports in 1914 of pig-iron 78,594 tons, valued at \$981,107; ferro-manganese, etc., 22,147 tons, valued at \$549,485, and charcoal pig-iron 86 tons, valued at \$1,082.

The total exports of iron and steel and manufactures thereof, in 1915, were valued at \$48,268,148, as against \$14,391,746 in 1914. The imports of iron and steel and manufactures thereof during the calendar year 1915 were valued at \$74,308,983, as compared with \$80,063,679 during the calendar year 1914.

Iron Ore.—The total shipments of iron ore from Canadian mines in 1915 were 398,112 tons, valued at \$774,427, as compared with 244,854 tons valued at \$542,041 in 1914. The quantity of imported iron ore used in Canadian blast furnaces in 1915 was about 1,314,957 tons, as compared with 1,324,326 tons of imported ore used in 1914.

Lead.—The production of lead in 1915 was 46,316,450 pounds, valued at \$2,593,721, as against 36,337,765 pounds, valued at \$1,627,568 in 1914.

The exports of lead in 1915 were pig lead 2,066,929 pounds, valued at \$79,067, lead in ore, etc., 1,845,100 pounds, valued at \$40,273; the exports in 1914 were pig lead 510,573 pounds, valued at \$19,507, and lead in ore, etc., 246,100 pounds, valued at \$2,681. The total value of the imports of lead and manufactures of, in 1915 was \$2,482,916, as compared with imports in 1914, valued at \$1,042,538.

Molybdenum.—The production of molybdenite in 1915 was equivalent to 29,210 pounds of concentrate, valued at \$28,450, as compared with a production in 1914 equivalent to 3,814 pounds of concentrate valued at \$2,063.

Nickel.—The production of nickel in 1915 including nickel contained in nickel-copper matte and nickel recovered as metal or oxide, etc., from the nickel-cobalt-silver ores of Cobalt, was 68,308,657 pounds valued at \$20,492,597, which included 68,077,023 pounds contained in nickel-copper matte produced in the Sudbury district and 231,634 pounds recovered in Canadian smelters in the treatment of ores from Cobalt. During 1915 there were smelted 1,272,283 tons of nickel-copper ores producing 67,703 tons of matte as against 947,053 tons of ore producing 46,396 tons of matte in 1914, the nickel contents of the latter being 45,517,937 pounds. There were also produced in 1914, 392,512 pounds of nickel oxide.

The exports of nickel contained in ore matte, etc., during 1915 were 66,410,442 pounds, valued at \$7,394,446, being 13,747,991 pounds to

Great Britain and 52,662,451 pounds to the United States. In 1914 the exports were 46,528,327 pounds, valued at \$5,149,427; being 10,291,979 pounds to Great Britain; 36,015,642 pounds to the United States, and 220,706 pounds to other countries.

The imports of nickel, nickel-silver, in ingots, bars, sheets, etc., in 1915 were 710,344 pounds, valued at \$197,168, as against 619,852 pounds, valued at \$155,427 in 1914.

Silver.—The production of silver contained in bullion, or estimated as recovered from mattes and ores, etc., exported, was in 1915, 26,625,960 fine ounces, valued at \$13,228,842, as compared with 28,449,821 fine ounces valued at \$15,593,631 in 1914.

The exports of silver contained in ores, mattes, etc., in 1915 were 27,672,481 ounces, valued at \$13,812,038, as against exports of 28,020,089 ounces, valued at \$15,584,813 in 1914. The imports of silver bullion during the calendar year 1915 were valued at \$337,254, as compared with bullion imports of \$629,279 in 1914.

Zinc.—The shipments of zinc ore in 1915 were 14,895 tons, valued at \$554,938, as compared with shipments of 10,893 tons, valued at \$262,563 in 1914. The total value of the imports of zinc and manufactures of zinc, in 1915 was \$2,775,358, as compared with imports, valued at \$1,210,652 in 1914.

NON-METALLIC PRODUCTS.

Actinolite.—A production of 220 tons, valued at \$2,420 was reported in 1915, as compared with 119 tons valued at \$1,304 in 1914.

Arsenic.—Smelter returns show a production in 1915 of 2,396 tons of arsenious oxide, valued at \$147,830, as compared with a production in 1914 of 1,737 tons, valued at \$104,015.

The exports of arsenic in 1915 were 2,318 tons, valued at \$174,190, as against 1,876 tons, valued at \$132,567 in 1914. The imports of sulphide of arsenic in 1915 were 171,993 pounds, valued at \$5,415 as against 11,494 pounds, valued at \$756 in 1914. The imports of arsenious oxide in 1915 were 14,222 pounds valued at \$657, as against 5,012 pounds, valued at \$249 in 1914.

Asbestos.—The shipments of asbestos in 1915 were 111,142 tons, valued at \$3,553,166, and of asbestic 25,700 tons, valued at \$21,819, as compared with shipments in 1914 of asbestos 96,542 tons, valued at \$2,892,266, and of asbestic 21,031 tons, valued at \$17,540.

The shipments in 1915 consisted of 5,370 tons of crude asbestos, valued at \$1,076,297, and 105,772 tons of mill stock valued at \$2,476,869. The 1914 shipments included 4,147.9 tons of crude asbestos, valued at \$773,193, and 92,394 tons of mill stock, valued at \$2,119,073.

Exports in 1915 were 84,584 tons, valued at \$2,734,695, as against 81,081 tons, valued at \$2,298,646 in 1914. There were also exported in 1915, 25,103 tons of asbestic sand, valued at \$157,410.

Imports of asbestos and manufactures of asbestos in 1915, were valued at \$168,894, and in 1914, \$282,053.

Chromite.—Shipments in 1915 were reported as 12,341 tons, valued at \$179,540, as against 136 tons, valued at \$1,210 in 1914.

The exports of chromite or chromic iron in 1915 were 7,290 tons, valued at \$81,838.

Coal.—The production of coal in 1915 was 13,267,023 tons, valued at \$32,111,182, as against 13,637,529 tons, valued at \$33,471,801 in 1914.

The exports of coal in 1915 were 1,766,543 tons, valued at \$5,406,058, as compared with 1,423,126 tons, valued at \$3,880,175 in 1914. The total imports of coal in 1915 were 12,465,902 tons, valued at \$28,345,605, as against imports in 1914 of 14,721,057 tons valued at \$39,801,498.

The 1915 imports included 6,106,794 tons of bituminous round and run-of-mine coal, valued at \$7,564,369; 4,072,192 tons of anthracite and anthracite dust, valued at \$18,753,980; and 2,286,916 tons of bituminous slack, such as will pass through a $\frac{3}{4}$ inch screen, valued at \$2,027,256. The consumption of coal in 1915 was approximately 23,906,692 tons, as against 26,852,323 tons in 1914.

The 1914 imports included 7,776,415 tons of bituminous round and run-of-mine coal, valued at \$14,954,321; 4,435,010 tons of anthracite and anthracite dust, valued at \$21,241,924; and 2,509,632 tons of bituminous slack, such as will pass through a $\frac{3}{4}$ inch screen, valued at \$3,605,253.

Coke.—The quantity of oven coke made in 1915 was 1,200,766 tons, the quantity sold or used was 1,170,473 tons, valued at \$4,258,580, as compared with 1,015,253 tons, made in 1914, and 1,023,860 tons sold or used, valued at \$3,658,514. The quantity of coal charged to coke ovens in 1915 was 1,856,393 tons, as compared with 1,541,913 tons in 1914. The exports of coke in 1915 were 35,869 tons, valued at \$160,053, and in 1914, 67,838 tons, valued at \$306,117.

The imports of coke in 1915 were 637,857 tons, valued at \$1,608,464, as compared with imports of 553,046 tons, valued at \$1,585,259 in 1914.

Corundum.—The total sales of grain corundum in 1915 were 262 tons, valued at \$33,138, as compared with sales of 548 tons, valued at \$72,176 in 1914. Exports for 1915 were 339 tons, valued at \$37,798, and, in 1914, 947 tons, valued at \$87,740.

Feldspar.—Shipments of feldspar in 1915 were 14,559 tons, valued at \$57,801, as compared with 18,060 tons, valued at \$70,824, in 1914. The exports are not separately recorded in 1915, but in 1914 were 18,072 tons, valued at \$74,100.

Fluorspar.—No production has been reported during the past three years. Canadian furnaces in 1915 used 13,520 tons of fluorspar and in 1914, 7,845 tons. Imports of hydrofluosilicic acid were 1,117,874 pounds, valued at \$36,085, as against 1,384,087 pounds, valued at \$41,576 in 1914.

Graphite.—Shipments of crude and milled graphite during 1915 totalled 2,635 tons, valued at \$124,223, as against 1,647 tons, valued at \$107,203 in 1914. The production of artificial graphite in 1915 was reported as 249 tons, as compared with 617 tons in 1914.

Exports of plumbago in 1915 are reported as 263 tons, valued at \$12,009, and manufactures of plumbago, valued at \$84,316. Exports in 1914 were; plumbago 919 tons, valued at \$50,528, and manufactures of plumbago, valued at \$72,718.

Imports of graphite in 1915 were valued at \$151,878, and included: plumbago, not ground, \$3,436; blacklead \$6,084; plumbago ground and manufactures of, \$35,597; and crucibles of clay or plumbago \$106,761. Imports of graphite in 1914 were valued at \$100,192, and included: plumbago not ground \$801, blacklead \$6,798, plumbago ground and manufactures of, \$42,680, and crucibles of clay or plumbago \$49,913.

Grindstones.—The production of grindstones, scythestones, and wood pulpstones in 1915 was 2,580 tons, valued as \$35,768, as compared with 3,976 tons, valued at \$54,504 in 1914. The exports in 1915 were: manufactured grindstones, valued at \$35,334; and stone for the manufacture of grindstones 180 tons, valued at \$900. The exports in 1914 were: manufactured grindstones, valued at \$24,113, and stone for the manufacture of grindstones 54 tons, valued at \$294.

The imports of abrasives in 1915 included: grindstones, valued at \$79,391, burrstones \$314, emery in bulk, crushed or ground \$67,067; manufactures of emery, carborundum, etc., \$139,665; pumice stone \$18,814; also iron sand \$3,263; sandpaper \$133,677; and artificial abrasives \$28,921. The imports of abrasives in 1914 included: grindstones valued at \$98,872; burrstones \$16; emery in bulk, crushed or ground \$29,127; manufactures of emery, carborundum, etc. \$88,881; pumice stone \$16,976; also iron sand, \$13,743; sandpaper \$138,415.

Gypsum.—The total shipments of gypsum, crude and calcined, in 1915 were 474,815 tons, valued at \$854,929, as compared with shipments of 516,880 tons, valued at \$1,156,507 in 1914. The tonnage of gypsum mined or quarried in 1915 was 505,989, and the quantity calcined 84,763 tons. In 1914, 579,841 tons of gypsum were mined or quarried and 138,212 tons calcined.

The shipments in 1915 included: crude, lump 346,947 tons, valued at \$375,815; crude crushed 48,735 tons, valued at \$67,007; fine ground 6,455 tons, valued at \$22,767; and calcined gypsum 72,678 tons, valued at \$389,340. The shipments in 1914 included: crude lump 351,729 tons,

valued at \$400,521, crude crushed 49,441 tons, valued at \$61,686; fine ground 6,097 tons, valued at \$14,496; and calcined gypsum 109,613 tons, valued at \$679,504.

The exports of gypsum in 1915 were 292,234 tons of crude gypsum, valued at \$336,380, and gypsum ground or calcined, valued at \$80,933. The 1914 exports were: 345,830 tons of crude gypsum, valued at \$404,234, and gypsum ground or calcined, valued at \$35,490.

The imports of gypsum in 1915 were valued at \$25,819, including: crude gypsum 1,799 tons, valued at \$7,734; ground gypsum 134 tons, valued at \$2,253; and plaster of Paris 2,441 tons, valued at \$15,832.

The imports of gypsum in 1914 were valued at \$75,031, and included: crude gypsum 3,572 tons, valued at \$16,448; ground gypsum, 536 tons, valued at \$4,301; and plaster of Paris 7,739 tons, valued at \$54,282.

Magnesite.—Shipments of magnesite in 1915 were 14,779 tons, valued at \$126,584, and in 1914, 358 tons, valued at \$2,240. Imports of magnesia in 1915 were 182,249 pounds, valued at \$9,695, as against 254,283 pounds, valued at \$16,429 in 1914.

Manganese.—Shipments of manganese in 1915 were reported as 201 tons, valued at \$9,360, as against 28 tons, valued at \$1,120 in 1914. The exports in 1915 were 255 tons, valued at \$6,855, as against 30 tons, valued at \$750, exported in 1914. The 1915 imports included 1,238 tons of manganese oxide, valued at \$46,678, as compared with 1,702 tons, valued at \$42,487 in 1914.

Mica.—The value of the mica production in 1915, as reported by mine operators, was \$91,905, as compared with \$109,061 in 1914. The exports of mica in 1915 were 879,631 pounds, valued at \$236,124, as against 669,163 pounds, valued at \$178,940 in 1914.

Mineral Pigments.—Shipments of barytes in 1915 were 550 tons, valued at \$6,875, as against 612 tons, valued at \$6,169 in 1914. The production of ochres, iron oxides, in 1915, was 6,248 tons, valued at \$48,353, as compared with 5,890 tons, valued at \$51,725 in 1914.

The exports of iron oxides in 1915 were 1,196 tons, valued at \$17,263, as against 1,777 tons, valued at \$22,311 in 1914. The imports in 1915 were ochres and ochrey earth and raw siennas 1,240 tons, valued at \$23,763, and oxides, dry fillers, fireproof umbers and burnt siennas 2,452 tons, valued at \$260,986, as compared with imports in 1914 comprising: ochres and ochrey earth and raw siennas 1,532 tons, valued at \$33,197, and oxides, dry fillers, fireproof umbers, and burnt siennas 4,023 tons, valued at \$244,867.

Mineral Water.—The value of the production of mineral water in 1915 for which returns were received was \$115,274, as compared with a value of \$134,111 in 1914. The imports of mineral and aerated waters in 1915

were valued at \$126,569, as against a value of \$199,153 in 1914. The exports in 1915 were valued at \$3,578, as against \$1,367 in 1914.

Natural Gas.—The production of natural gas in 1915 was 20,124 million cubic feet, valued at \$3,706,035, as compared with 21,693 million cubic feet, valued at \$3,484,727 in 1914.

Peat.—Shipments of peat for fuel purposes in 1915 were 300 tons, valued at \$1,050, as compared with 685 tons, valued at \$2,470 in 1914.

Petroleum.—The production of crude petroleum in 1915 was 215,464 barrels or 7,541,230 gallons, valued at \$300,572, as compared with 214,805 barrels, or 7,518,168 gallons, valued at \$343,124 in 1914.

Exports of refined oil in 1915 were 103,488 gallons, valued at \$14,107, and 2,922 gallons, valued at \$826 in 1914. There was an export in 1915 of naphtha and gasoline of 16,644 gallons, valued at \$4,540; crude mineral oil 35,977 gallons, valued at \$1,789, and also an export of other oils n.e.s. of 1,247,376 gallons, valued at \$290,943, which may have included products of petroleum. Exports in 1914 included: naphtha and gasoline, 43,023 gallons, valued at \$11,607, crude mineral oil 3,996 gallons, valued at \$362, and also an export of other oils n.e.s. of 455,867 gallons, valued at \$104,179.

The total value of the imports of petroleum and petroleum products in 1915 was \$8,047,781, as against a value of \$11,174,763 in 1914.

The total imports of petroleum oils, crude and refined, in 1915 were 236,913,765 gals., valued at \$7,979,264. The oil imports included, crude oil 192,588,487 gals., valued at \$3,678,021, refined and illuminating oils, 6,792,873 gals., valued at \$405,019; gasoline 28,030,972 gals., valued at \$2,693,717; lubricating oils 4,547,179 gals., valued at \$755,535, and other oils, products of petroleum 4,954,254 gals., valued at \$446,972. The oil imports in 1914 were: crude oil 195,207,210 gals., valued at \$5,750,971; refined and illuminating oils 12,833,065 gals., valued at \$970,481; gasoline 24,396,401 gals., valued at \$2,747,360; lubricating oils 5,767,676 gals., valued at \$940,143, and other oils, products of petroleum 6,283,621 gals., valued at \$663,407, making a total of 244,487,973 gals., valued at \$11,072,-362.

The imports of petroleum products in 1915 included 980,662 pounds of paraffin and paraffin wax candles, valued at \$68,517, as compared with imports in 1914 of 1,594,236 pounds, valued at \$102,401.

Phosphate.—Shipments of phosphate or apatite in 1915 were 217 tons, valued at \$2,502, as compared with 954 tons, valued at \$7,275 in 1914. Exports in 1915 were reported as 179 tons, valued at \$1,860, as against 247 tons, valued at \$677 in 1914. There was an export of phosphorus in 1915 of 545,050 pounds, valued at \$77,476, while in 1914, 610,350 pounds, valued at \$92,303 were exported.

The imports of phosphate rock (fertilizer) in 1915 were valued at \$14,148; phosphorus 75,900 pounds, valued at \$29,572; acid phosphate 1,964,131 pounds, valued at \$105,035; and manufactured fertilizers, valued at \$734,952. The imports of phosphate rock (fertilizer) in 1914 were valued at \$20,220; phosphorus 20,994 pounds, valued at \$6,760; acid phosphate 1,874,486 pounds, valued at \$97,862; and manufactured fertilizers, valued at \$677,174.

Pyrites.—The production of pyrites in 1915 was 286,038 tons, valued at \$985,190, as compared with 228,314 tons, valued at \$744,508 in 1914. The exports in 1915 were 137,598 tons, valued at \$527,318, as against exports of 89,999 tons, valued at \$377,985 in 1914. The imports of brimstone or sulphur in 1915 were 30,182 tons, valued at \$480,317, as against 41,954 tons, valued at \$870,868 in 1914.

Quartz.—The production of quartz in 1915 was reported as 127,108 tons, valued at \$205,153, as compared with a production in 1914 of 54,148 tons, valued at \$84,583. There were imported during 1915, 402 tons of silex or crystallized quartz, valued at \$5,527, and 4,327 tons of flint, valued at \$48,966, and in 1914, 870 tons of silex or crystallized quartz, valued at \$15,502, and 3,835 tons of flint, valued at \$47,931.

Salt.—The total sales of salt in 1915 were 119,900 tons, valued at \$600,226 (exclusive of packages). The value of the packages used was \$280,747. In 1914 the sales were 107,038 tons, valued at \$493,648, and value of packages used \$278,897.

Exports of salt in 1915 were 889,300 pounds, valued at \$5,836, and in 1914, 952,700 pounds, valued at \$5,229. The total imports of salt in 1915 were valued at \$517,526, and included: 34,481 tons, valued at \$135,446, subject to duty; and 103,006 tons, valued at \$382,080, duty free. The 1914 imports were valued at \$540,881, and included: 33,893 tons, valued at \$151,108, subject to duty; and 108,753 tons, valued at \$389,773, duty free.

Among the imports of soda products in 1915 are included: soda ash or barilla 65,566,168 pounds, valued at \$448,845, soda bichromate 467,943 pounds, valued at \$34,692; caustic soda, in packages of 25 pounds or more, 7,737,149 pounds, valued at \$184,468; sal soda 6,833,000 pounds, valued at \$43,312; nitrate of soda or cubic nitre 45,285,220 pounds, valued at \$1,050,648; and sulphate of soda 30,970,231 pounds, valued at \$147,047.

Talc.—The production of talc in 1915 was 11,885 tons, valued at \$40,554, as against 10,808 tons, valued at \$40,418 in 1914. Imports of talc for the year 1915 were 154 tons, valued at \$1,866, as against 584 tons, valued at \$8,983 in 1914.

Tripolite.—There were 317 tons of tripolite, valued at \$12,119, shipped in 1915, as against shipments in 1914 of 650 tons, valued at \$13,000.

STRUCTURAL MATERIALS AND CLAY PRODUCTS.

Cement.—The total sales of cement in 1915 were 5,681,032 barrels, valued at \$6,977,024, as against 7,172,480 barrels, valued at \$9,187,924 in 1914. The exports of cement in 1915 were valued at \$5,161, as compared with exports valued at \$2,223 in 1914.

The imports in 1915 included: manufactures of cement, valued at \$7,410; and Portland cement 98,664 hundredweight (28,190 barrels), valued at \$40,426.

The imports of cement in 1914 included: manufactures of cement, valued at \$12,533; and Portland cement 343,076 hundredweight (98,022 barrels), valued at \$147,158.

The consumption of Portland cement in Canada in 1915 was approximately 5,709,222 barrels, as compared with 7,270,502 barrels in 1914.

Clay Products.—The total value of the production of clay products in Canada in 1915 was \$3,914,488, as compared with a total value of \$6,871,957 in 1914. Brick and tile products alone were valued at \$2,673,048, as against \$5,208,976 in 1914. The value of sewerpipe production in 1915 was \$799,446, as compared with \$1,104,499 in 1914.

The only clay products exported in 1915 were: 1,155,000 building brick, valued at \$9,089; manufactures of clay, valued at \$25,202; and earthenware, valued at \$11,281. The exports in 1914 were 1,486,000 building brick, valued at \$11,871; manufactures of clay, valued at \$26,866, and earthenware valued at \$9,336. The total imports of clay products in 1915 were valued at \$2,998,465, and included: brick and tile, valued at \$1,301,359; earthenware and chinaware, \$1,460,010; and clays, valued at \$237,096.

The total imports of clay products in 1914 were valued at \$4,467,140, and included: brick and tile valued at \$1,986,790; earthenware and chinaware \$2,192,222; and clays valued at \$288,128.

Kaolin.—In 1915 shipments of 1,300 tons, valued at \$13,000, were reported, as compared with shipments in 1914 of 1,000 tons, valued at \$10,000.

Lime.—The total production of lime in 1915 was 5,047,244 bushels, valued at \$1,015,702, as compared with 7,028,582 bushels, valued at \$1,360,628 in 1914. The exports of lime in 1915 were valued at \$15,617, as against exports valued at \$16,927 in 1914. The imports of lime in 1915 were 189,774 barrels, valued at \$98,040, and in 1914, 340,829 barrels, valued at \$211,123.

Sand-Lime Brick.—The total sales of sand-lime brick in 1915 were 17,960,802, valued at \$141,742, an average value of \$7.89 per thousand. The sales in 1914 were 70,650,030, valued at \$609,515, an average value of \$8.63 per thousand.

Slate.—The production of slate in 1915 was 397 squares, valued at \$2,039, and 1,075 squares, valued at \$4,837 in 1914.

The imports of slate in 1915 were valued at \$108,676, and included roofing slate, valued at \$34,528; school writing slate, \$38,874, slate pencils \$4,954, and manufactures of slate, \$30,320. The imports of slate in 1914 were valued at \$213,256, and included: roofing slate valued at \$91,977; school writing slate \$54,723; slate pencils \$6,514, and manufactures of slate \$59,444.

Stone.—The total value of the production of stone of all kinds in 1915 was \$4,244,997, as compared with a value of \$5,469,056 in 1914. The value of stone exports in 1915 was \$72,777, as against \$72,080 in 1914, and the total value of stone imported in 1915 was \$539,173, as against imports valued at \$1,252,869 in 1914. The production in 1915 included: granite, valued at \$1,525,553, limestone \$2,312,081, marble \$158,027, and sandstone \$249,336. The production in 1914 included: granite, valued at \$2,176,602; limestone \$2,672,781; marble \$132,533, and sandstone \$487,140.

Sand and Gravel.—According to returns received, the production of sand and gravel in 1915 was 6,445,717 tons, valued at \$1,624,767, as compared with a value of \$2,505,310 in 1914. The exports of sand and gravel in 1915 were 808,022 tons, valued at \$380,549, and the imports 199,597 tons, valued at \$120,756.

PRODUCTION BY PROVINCES.

A summary of the mineral production by provinces in 1914 and 1915 is shown in the accompanying tables, in the first of which the total production in the several provinces and the percentages of each, are given for the past three years. Ontario continues as the largest contributor to the total, having a production of \$61,061,287, or 44·5 per cent, as against \$53,034,677, or 41·1 per cent of the total in 1914. British Columbia was second, with a production of \$28,689,425, or 20·9 per cent, against \$24,164,039, or 18·7 per cent of the total in the previous year. Nova Scotia, third in importance, had a production of \$18,088,342, or 13·2 per cent of the total in 1915, as against \$17,584,639, or 13·6 per cent of the total in 1914. Quebec, in fourth place, had a production of \$11,619,275, or 8·5 per cent; Alberta occupied fifth place, with a production of \$9,909,347, or 7·2 per cent. The Yukon District, Manitoba, New Brunswick, and Saskatchewan, follow in the order named.

In making these comparisons it should be remembered that Nova Scotia is not credited with the large production of pig-iron and steel at Sydney and Sydney Mines, which is made almost entirely from imported iron ores and is not naturally credited as Canadian mine product. Similarly a large proportion of the pig-iron production in Ontario is excluded from

the total value, because it is derived from imported ores. The Province of Quebec also, is not credited with the production of aluminium at Shawenegan Falls, which is made from imported bauxite.

Mineral Production by Provinces, 1913, 1914, and 1915.

Province.	1913.		1914.		1915.	
	Value of production.	Per cent of total.	Value of production.	Per cent of total.	Value of production.	Per cent of total.
*Nova Scotia.....	\$ 19,376,183	13.30	\$ 17,584,639	13.65	\$ 18,088,342	13.19
New Brunswick.....	1,102,613	0.76	1,014,570	0.79	903,467	0.66
Quebec.....	13,475,534	9.25	11,836,929	9.19	11,619,275	8.48
Ontario.....	59,167,749	40.63	53,034,677	41.16	61,071,287	44.54
Manitoba.....	2,214,496	1.52	2,413,489	1.87	1,318,387	0.96
Saskatchewan.....	881,142	0.60	712,313	0.55	451,933	0.33
Alberta.....	15,054,046	10.34	12,684,234	9.84	9,909,347	7.23
British Columbia.....	28,086,312	19.29	24,164,039	18.75	28,689,425	20.92
Yukon.....	6,276,737	4.31	5,418,185	4.20	5,057,708	3.69
Dominion.....	145,634,812	100.00	128,863,075	100.00	137,109,171	100.00

* Includes a small production of lime from Prince Edward Island in 1913 and 1914.

Mineral Production of Nova Scotia, 1914 and 1915.

Product.	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
Antimony ore.....Tons			1,288	\$ 77,300
Gold.....Ozs.	2,904	\$ 60,031	6,636	137,180
Barytes.....Tons	612	6,169	550	6,875
Coal....."	7,370,924	16,452,955	7,463,370	16,659,308
Grindstones....."	350	5,270	285	5,300
Gypsum....."	303,155	368,931	298,864	339,857
Manganese....."	28	1,120	51	5,760
Tripolite....."	650	13,000	317	12,119
Clay products....."		266,204		221,881
Lime.....Bus.	517,722	103,748	915,086	183,017
Stone....."		221,090		367,924
Other products....."		86,121		71,821
Total.....		17,584,639		18,088,342

The total production of pig-iron in Nova Scotia in 1915 was 420,275 tons valued at \$5,463,575, and in 1914, 227,052 tons valued at \$2,951,676.

Mineral Production of New Brunswick, 1914 and 1915.

Product.	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
Antimony, refined.....Lbs.			13,440	\$ 2,688
Iron ore sold for export.....Tons	4,775	\$ 10,841	3,683	8,261
Coal....."	98,049	241,075	127,391	309,612
Grindstones....."	3,626	49,234	2,295	30,468
Gypsum....."	79,083	200,680	74,501	184,929
Manganese ore....."			150	3,600
Natural gas.....M cu. ft	425,826	54,249	430,692	60,383
Petroleum.....Bls.	1,725	2,742	1,020	1,423
Clay products....."		66,502		35,780
Lime.....Bus.	391,739	102,980	369,117	93,797
Stone....."		261,172		153,512
Other products....."		25,095		19,014
Total.....		1,014,570		903,467

Mineral Production of Quebec, 1914 and 1915.

Product.	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
Copper.....Lbs.	4,201,497	\$ 571,488	4,197,482	\$ 725,115
Gold.....Ozs.	1,292	26,708	1,099	22,720
Lead.....Lbs.			40,401	2,262
Silver.....Ozs.	57,737	31,646	63,450	31,524
Zinc ore.....Tons	969	10,017	300	16,500
Asbestos and asbestic.....	117,573	2,909,806	136,842	3,574,985
Chromite.....	136	1,210	12,341	179,543
Feldspar.....	98	2,156	572	2,005
Graphite.....	261	18,886	751	5,431
Magnesite.....	358	2,240	14,779	126,584
Mica.....		62,794		50,390
Mineral water.....Gals.		16,566		18,086
Ochres, iron oxides.....Tons	5,890	51,725	6,248	48,353
Phosphate.....	554	4,875	200	2,400
Pyrites.....	117,698	470,792	142,735	570,940
Quartz.....	847	847	778	778
Cement.....Bls.	2,846,061	3,331,601	2,390,724	2,812,797
Clay products.....		1,257,700		905,425
Kaolin.....Tons	1,000	10,000	1,300	13,000
Lime.....Bus.	1,767,935	389,064	1,351,306	274,831
Slate.....Squares	1,075	4,837	397	2,039
Stone.....		2,286,078		1,966,194
Other products.....		375,893		267,373
Total.....		11,836,929		11,619,275

There was also in this Province an important production of aluminium from imported ores.

Mineral Production of Ontario, 1914 and 1915.

Product.	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
Cobalt, (metallic and in oxide, etc.).....Lbs.}	889,027	\$ 571,710	504,212	\$ 536,268
Cobalt.....}				
Cobalt-nickel residues, mixed cobalt and nickel				
oxides.....Lbs.		79,995	(c) (d)	
Copper.....Lbs.	28,948,211	3,937,536	39,361,464	6,799,693
Gold.....Ozs.	268,264	5,545,509	406,577	8,404,693
Iron ore, sold for export.....Tons	55,635	124,459	86,047	173,120
Iron, pig, from Canadian ore (a).....Lbs.	95,744	1,138,912	158,595	1,715,874
Lead.....Lbs.			88,985	4,983
Molybdenite.....		1,500	23,300	25,800
Nickel.....	45,517,937	13,655,381	68,308,657	20,492,597
Nickel oxide.....	392,512	34,883	(e)	
Silver.....Ozs.	25,139,214	13,779,055	22,748,609	11,302,419
Actinolite.....Tons	119	1,304	220	2,420
Arsenious oxide.....	1,737	104,015	2,396	147,830
Corundum.....	548	72,176	262	33,138
Feldspar.....	17,962	68,668	13,987	55,796
Graphite.....	1,386	88,317	2,559	118,792
Gypsum.....	81,219	204,033	81,172	190,422
Mica.....		46,267		41,515
Mineral water.....		115,215		95,788
Natural gas (b).....M. cu. ft.	14,094,521	2,215,808	15,211,523	2,622,838
Peat.....Tons	685	2,470	300	1,050
Petroleum.....Bls.	212,693	338,182	214,444	299,149
Phosphate.....Tons	400	2,400	17	102
Pyrites.....	110,616	273,716	143,303	414,250
Quartz.....	52,947	83,628	95,771	143,257
Salt.....	107,038	493,648	119,900	600,226
Talc.....	10,808	40,418	11,885	40,554
Cement.....Bls.	2,775,142	3,062,129	2,407,670	2,597,807
Clay products.....		3,979,606		2,254,863
Lime.....Bus.	3,393,078	556,850	1,903,914	328,515
Sand-lime brick.....No.	43,804,995	329,403	13,237,682	93,965
Stone.....		1,253,849		806,137
Other products.....		833,635		727,426
Total.....		53,034,677		61,071,287

(a) The total production of pig-iron in Ontario in 1915 was 493,500 tons, valued at \$5,910,624; in 1914 556,112 tons, valued at \$7,051,180.

(b) Figures for 1915, from Ontario Bureau of Mines. (c) Included under cobalt. (d) Included under cobalt and nickel. (e) Included under nickel.

Mineral Production of Manitoba, 1914 and 1915.

Product.	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
Calced gypsum.....Tons	53,423	\$ 382,563	20,278	\$ 139,721
Clay products.....		317,488		93,674
Lime.....Bus.	526,167	92,898	281,432	71,372
Cement.....Bls.	402,131	737,046	339,554	625,369
Sand-lime brick.....No.	19,200,809	207,501	2,775,420	31,121
Stone.....		361,912		153,464
Other products.....		314,081		203,666
Total.....		2,413,489		1,318,387

Mineral Production of Saskatchewan, 1914 and 1915.

Product.	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
Coal.....Tons	232,299	\$ 374,245	240,107	\$ 365,246
Clay products.....		98,349		44,406
Sand-lime brick.....No.	1,550,000	17,700	473,000	4,075
Other products.....		222,019		38,206
Total.....		712,313		451,933

Mineral Production of Alberta, 1914 and 1915.

Product.	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
Gold.....Ozs.	48	\$ 992	195	\$ 4,026
Coal.....Tons	3,683,015	9,350,392	3,360,818	8,283,079
Natural gas.....M. cu. ft.	7,172,157	1,214,670	4,481,947	1,022,814
Cement.....Bls.	641,395	1,212,342	233,648	415,009
Clay products.....		462,199		115,696
Lime.....Bus.	280,252	58,321	74,152	14,445
Sand-lime brick.....No.	5,453,000	49,731	764,700	6,191
Stone.....		60,272		890
Other products.....		275,315		47,197
Total.....		12,684,234		9,909,347

Mineral Production of British Columbia, 1914 and 1915.

Product.	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
Copper (a).....Lbs.	41,219,202	\$5,606,636	56,692,988	\$9,793,714
Gold.....Ozs.	252,730	5,224,393	273,376	5,651,184
Lead.....Lbs.	36,289,845	1,625,422	45,377,064	2,541,116
Platinum.....Ozs.			23	1,063
Silver....."	3,159,897	1,731,971	3,565,852	1,771,658
Zinc ore.....Tons	9,924	252,546	14,595	538,438
Coal.....Tons	2,239,799	6,999,374	2,065,613	6,455,041
Mineral water.....		2,330		1,400
Quartz.....Tons			30,559	61,118
Cement.....Bls.	491,151	833,606	309,436	526,042
Clay products.....		413,909		229,763
Lime.....Bus.	151,689	56,767	152,237	49,725
Stone.....		1,024,683		796,876
Other products.....		392,402		272,287
Total.....		24,164,039		28,689,425

(a) Smelter recoveries of copper.

Mineral Production of Yukon, 1914 and 1915.

Product.	1914.		1915.	
	Quantity.	Value.	Quantity.	Value.
Copper.....Lbs.	1,367,050	\$ 185,946	533,216	\$ 92,113
Gold.....Ozs.	247,940	5,125,374	230,173	4,758,098
Lead.....Lbs.	47,920	2,146	810,000	45,360
Silver.....Ozs.	92,973	50,959	248,049	123,241
Coal.....Tons	13,443	53,760	9,724	38,896
Total.....		5,418,185		5,057,708

Mineral Production by Provinces, 1899-1915.

Calendar Year.	Nova Scotia*.	New Brunswick.	Quebec.	Ontario.	Manitoba.	Alberta.	Saskatchewan.	Yukon.	British Columbia.	Total.
1899.....	\$ 6,817,274	\$ 420,227	\$ 2,585,635	\$ 9,819,557		\$17,108,707			\$12,482,605	\$ 49,234,005
1900.....	9,298,479	439,060	3,292,383	11,258,099		23,452,330			16,680,526	64,420,877
1901.....	7,770,159	467,985	3,759,984	13,970,010		19,297,940			20,531,833	65,797,911
1902.....	10,686,549	607,129	3,743,636	14,619,091		16,127,400			17,448,031	63,231,836
1903.....	11,431,914	580,495	3,585,938	14,160,033		14,082,986			17,899,147	61,740,513
1904.....	11,212,746	559,913	3,688,482	12,582,843		12,713,613			19,325,174	60,082,771
1905.....	11,507,047	559,035	4,405,975	18,833,292		11,387,642			22,386,008	69,078,999
1906.....	12,894,303	646,328	5,242,058	25,111,682		10,092,726			25,299,600	79,286,697
1907.....	14,532,040	664,467	6,205,553	30,381,638	\$ 898,775	\$ 4,657,524	\$ 533,251	\$3,335,898	25,656,056	86,865,202
1908.....	14,487,108	579,816	6,372,949	30,623,812	584,374	5,122,505	413,212	3,669,290	23,704,035	85,557,101
1909.....	12,504,810	657,035	7,086,265	37,374,577	1,193,377	6,047,447	456,246	4,032,678	22,479,006	91,831,441
1910.....	14,195,730	581,942	8,270,136	43,548,078	1,500,359	8,996,210	498,122	4,764,474	24,478,572	106,823,623
1911.....	15,409,397	612,830	9,304,717	42,796,162	1,791,772	6,662,673	636,706	4,707,432	21,299,305	103,220,994
1912.....	18,922,236	771,004	11,656,998	51,985,876	2,463,074	12,073,589	1,165,642	5,933,242	30,076,635	135,048,290
1913.....	19,376,183	1,102,613	13,475,534	59,167,749	2,214,496	15,054,046	881,142	6,276,737	28,086,312	145,634,812
1914.....	17,584,639	1,014,570	11,836,929	53,034,677	2,413,489	12,684,234	712,313	5,418,185	24,164,039	128,863,075
1915.....	18,088,342	903,467	11,619,275	61,071,287	1,318,387	9,909,347	451,933	5,057,708	28,689,425	137,109,171

*Includes a small production of lime from Prince Edward Island.

MINE PRODUCTION.

For a number of years past this Division has endeavoured to obtain from every mine operator in Canada, an annual return with respect to labour employed, wages paid, tonnage and value of ores or minerals mined, treated and shipped, and in the case of metallic ores, the quantities of metals contained in the ores shipped or treated. In the case, however, of gold placer mining and the production of crude petroleum, it has not as yet been found feasible to obtain complete returns from the operators themselves, so that in these cases, while a record of production is available, there is no record of the labour employed, nor of the wages paid.

Statistics covering each of the past six years are shown in the accompanying tables. According to the records shown the total value of the mineral production compiled on this basis was \$115,158,848 in 1915, as against \$114,239,635 in 1914, \$126,444,201 in 1913, \$120,332,966 in 1912, \$91,876,084 in 1911, and \$92,501,244 in 1910. Excluding placer and hydraulic workings and petroleum wells, the total number of shipping mines, clay works, quarries, etc., in 1915 was 1,618, as against 1,661 in 1914, and 1,529 in 1913. The total number of men employed was 56,876 in 1915, as against 66,855 in 1914, and 71,011 in 1913. The total wages paid were \$37,720,762 in 1915, as against \$43,609,696 in 1914, and \$50,368,602 in 1913.

The total number of metalliferous mines shipping in 1915 exclusive of placer and hydraulic workings was 205, as against 187 in 1914, and 183 in 1913; number of men employed in 1915, 12,698, as against 11,994 in 1914 and 12,437 in 1913; wages paid \$11,805,919 in 1915, as against \$11,669,854 in 1914, and \$11,746,400 in 1913; tons of ore mined 6,138,150 in 1915, as against 4,997,406 in 1914, and 4,736,288 in 1913; tons of ore concentrates, or metal shipped from mines 4,259,734 in 1915 as against 3,115,855 in 1914, and 3,423,414 in 1913; total net value of shipments including placer gold \$53,864,518 in 1915, compared with \$44,763,179 in 1914, and \$47,170,740 in 1913.

In non-metalliferous mining, exclusive of stone quarries, clay works, etc., and not including petroleum wells, there were employed in 1915 an average of 30,392 men earning in wages \$20,257,126, as against 33,732 men, earning in wages \$22,058,526 in 1914, and 34,207 men employed and \$25,752,148 wages paid in 1913.

The manufacture of cement, clay products, and lime, and the quarrying of stone, etc., employed in 1915 an average of 13,786 men earning in wages \$5,657,717, as against 21,129 men earning in wages \$9,881,316 in 1914. These operations in 1913 engaged an average of 24,367 men earning \$12,870,054.

It should be noted that these records cover only active shipping mines and do not include the labour employed in prospecting or in developing new properties, nor is there included any record of the labour employed

in the smelting and refining of ores, nor in blast furnace operations. The values of the ores given herewith are in general those furnished by the operators. In certain cases, however, where such values have not been furnished, estimates have been made.

There has been added to the statement of ore shipments in 1915, 1914, and 1913, tables showing the quantities of metals contained in the ores shipped, the record showing the total quantities of metals contained without any deductions or allowances being made for smelter or treatment losses. Comparison of this record of metal contents of ore shipments with statistics of the production of the metals is not in all cases feasible because of the lapse of time between the shipment from the mine and the treatment at the smelter.

Mine Production, 1910.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground	Surface.				
METALLIFEROUS ORES.	No.	No.		\$	Tons.	Tons.	\$
Iron ores.....	8	971		443,998	335,768	259,418	574,362
Milling gold ores—							
Bullion shipped.....							659,987
Concentrates.....	47	969		725,989	138,021	8,997	565,340
Silver-cobalt ores—							
Mine bullion shipped.....						35	542,034
Ore and concentrate.....	38	1,623	1,322	2,642,133	274,780	35,627	15,344,470
Nickel-copper ores.....	7	660	286	719,237	652,392	652,392	2,609,568
Copper ores.....	3	118	97	105,366	54,220	36,714	172,162
Silver-lead and zinc ores.....	48	592	282	850,416	180,070	58,418	1,668,415
Copper-gold-silver ores.....	19	1,432	487	1,872,242	1,958,591	1,924,405	7,888,306
Shipping mines not reporting—							
Silver-lead.....	12						
Copper-gold.....	9				1,994	1,994	.....
Placer mining—							
Yukon.....							4,550,000
British Columbia.....							540,000
Other provinces.....							1,850
Total metallic.....	191	8,839		7,359,381	3,595,836	2,978,000	35,116,494
Total non-metallic.....		36,210		22,698,000	16,148,993	13,800,989	37,757,158
Total structural material.....		17,259		7,547,000	.....	.....	19,627,592
Total.....		62,308		37,604,381	.....	.....	92,501,244

Mine Production, 1911.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground	Surface.				
METALLIFEROUS ORES.	No.	No.		\$	Tons.	Tons.	\$
Iron ores.....	8	943		449,468	421,113	210,344	522,319
Milling gold ores—							
Bullion shipped.....							513,991
Concentrates.....	45	1,085		954,659	118,758	8,026	663,213
Silver-cobalt ores—							
Mine bullion shipped.....						130	2,007,440
Ore and concentrate.....	36	1,794	1,448	2,722,228	254,290	25,539	14,400,245
Nickel-copper ores.....	7	858	425	889,894	612,511	612,511	2,450,044
Copper ores.....	2	119	67	98,084	66,088	39,047	247,555
Silver-lead and zinc ores.....	40	528	297	809,862	120,323	48,660	1,186,996
Gold-copper-silver ores.....	22	1,495	563	1,933,385	1,602,247	1,486,931	7,727,696
Placer mining—							
Yukon.....							4,606,812
British Columbia.....							426,000
Other provinces.....							8,202
Total metallic.....	160	9,622		7,857,580	3,195,330	2,431,188	34,760,513
Total non-metallic.....		32,126		18,469,420	13,890,468	12,247,348	34,405,960
Total structural materials.....		19,004		8,827,508			22,709,611
		60,752		35,154,508			91,876,084

Mine Production, 1912.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground	Surface.				
METALLIFEROUS ORES.	No.	No.		\$	Tons.	Tons.	\$
Iron ores.....	8	524		371,938	171,792	215,883	523,315
Milling gold ore—							
Bullion shipped.....	43					5	2,278,066
Concentrates.....		1,671		1,551,006	290,297	6,114	669,727
Silver-cobalt ores—							
Mine bullion shipped.....	31					164	2,899,360
Ore and concentrate.....		1,685	1,448	3,107,286	319,348	29,106	14,592,559
Nickel-copper ores.....	8	970	830	1,404,652	737,726	737,726	2,953,306
Copper ores.....	3	154	95	160,765	64,952	60,869	508,993
Silver-lead and zinc ores.....	50	597	331	1,002,203	202,343	66,377	2,767,741
Gold-copper-silver ores.....	20	1,434	873	2,515,728	2,408,059	2,244,193	13,113,144
Tungsten concentrates.....						14	7,840
Placer mining—							
Yukon.....							5,576,493
British Columbia.....							555,500
Other provinces.....							11,379
Total metalliferous.....	163	10,612		10,113,578	4,194,517	3,360,451	46,457,423
Total non-metalliferous.....	443	33,954		23,877,781	17,165,628	15,548,981	45,080,674
Total structural materials.....	831	22,168		11,511,120			28,794,869
	1,437	66,734		45,502,479			120,332,966

Mine Production, 1913.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground.	Sur-face.				
METALLIFEROUS ORES.	No.	No.		\$	Tons.	Tons.	\$
Iron ores.....	12	877		529,934	324,935	307,634	629,843
Milling gold ore—							
Bullion shipped.....						11	5,060,018
Concentrates.....	50	2,210		2,079,005	515,855	10,269	873,901
Silver-cobalt ores—							
Mine bullion shipped.....						260	4,539,906
Ore and concentrate.....	30	2,089	1,525	3,387,069	456,241	40,579	12,565,718
Nickel-copper ores....	9	1,258	617	1,665,659	784,697	784,697	3,138,788
Copper ores.....	3	191	92	155,318	97,899	87,376	458,136
Silver-lead and zinc ores.....	57	830	468	1,287,761	256,302	85,978	3,276,812
Zinc products.....						{ Zinc 7,889	186,827
Gold-copper-silver ores.	22	1,413	867	2,641,654	2,300,350	2,098,775	10,056,739
Placer mining—							
Yukon.....							5,874,052
British Columbia.....							510,000
Other provinces.....							
Total metalliferous....	183	12,437		11,746,400	4,736,288	3,423,468	47,170,740
Total non-metalliferous	435	34,207		25,752,148	18,636,039	16,198,066	48,463,709
Total structural materials.....	911	24,367		12,870,054			30,809,752
	1,529	71,011		50,368,602			126,444,201

Mine Production 1913, Content of Shipments.

	Gold.	Silver.	Nickel.	Copper.	Lead.	Zinc.
	Ozs.	Ozs.	Lbs.	Lbs.	Lbs.	Lbs.
Milling gold ore—						
Bullion.....	250,851	59,015				
Concentrates.....	46,959	33,898		2,354	142,497	
Silver-cobalt ores—						
Mine bullion shipped.....		7,599,929				
Ore and concentrate.....		21,862,174				
Nickel-copper ores.....			51,203,607	27,010,719		
Copper ores.....	738	36,393		4,996,393		
Silver-lead zinc ores....	999	2,564,155			53,807,570	
Zinc products.....		143,459				7,069,800
Gold-copper-silver ores.	207,486	733,758		60,090,180		
Placer mining—						
Yukon.....	282,320	63,522				
British Columbia.....	24,671					
Total.....	814,024	33,096,303	51,203,607	92,099,646	53,950,067	7,069,800

Mine Production, 1914.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground.	Surface.				
METALLIFEROUS ORES.	No.	No.		\$	Tons.	Tons.	\$
Iron ores.....	5	598		364,489	345,410	244,854	542,041
Milling gold ore—							
Bullion shipped.....						13	6,101,463
Concentrates.....	44	1,070	1,206	2,603,414	754,732	6,974	860,379
Silver-cobalt ores—							
Mine bullion shipped.....						354	5,665,006
Ore and concentrate.....	29	1,412	1,883	3,207,116	733,174	16,917	7,827,140
Nickel-copper ores.....	9	736	1,286	1,693,997	1,000,364	999,908	5,020,003
Copper ores.....	4	113	180	177,721	119,292	117,762	502,637
Silver-lead and zinc ores.....	76	394	817	1,110,876	186,646	70,207	2,652,802
Zinc products.....						10,893	262,563
Gold-copper-silver ores.....	20	823	1,746	2,512,241	1,857,788	1,647,973	9,580,537
Placer mining—							
Yukon.....						10	5,182,616
British Columbia.....						1	565,000
Other provinces.....						(a)	992
Total metalliferous.....	187	11,994		11,669,854	4,997,406	3,115,855	44,763,179
Total non-metalliferous.....	451	33,732		22,058,526	17,078,300	14,708,307	43,467,229
Total structural materials.....	1,023	21,129		9,881,316			26,009,227
	1,661	66,855		43,609,696	22,075,706	17,824,162	114,239,635

(a) Alberta production.

Mine Production 1914, Content of Shipments.

	Gold.	Silver.	Nickel.	Copper.	Lead.	Zinc.
	Ozs.	Ozs.	Lbs.	Lbs.	Lbs.	Lbs.
Milling gold ore—						
Bullion.....	289,860	85,110				
Concentrates.....	38,717	64,218		90	15,141	
Silver-cobalt ores—						
Mine bullion shipped.....		10,335,527				
Ore and concentrate.....		15,523,608				
Nickel-copper ores.....		51,440	60,800,799	36,300,532		
Copper ores.....	1,039			6,450,899		
Silver-lead zinc ores.....	334	2,501,820			50,527,130	
Zinc products.....		376,420				9,101,460
Gold-copper-silver ores.....	182,784	761,890		53,771,126		
Placer mining—						
Yukon.....	247,753	55,744				
British Columbia.....	27,332					
Alberta.....	48					
Total.....	787,887	29,755,777	60,800,799	96,522,647	50,542,271	9,101,460

Mine Production, 1915.

	No. of mines or works.	Men employed.		Wages paid.	Ores or minerals mined.	Metals, ores, concentrates or minerals shipped.	Net value of shipments.
		Under-ground.	Sur-face.				
METALLIFEROUS ORES	No.	No.		\$	Tons.	Tons.	\$
Antimony ore.....	7	157		55,038	15,318	1,491	83,971
Molybdenite.....	4	52		16,990		37	28,450
Iron ores.....	5	399		230,346	251,742	398,112	774,427
Milling gold ore—							
Bullion shipped.....						18	8,953,130
Concentrates.....	50	1,324	1,555	2,893,187	1,180,477	8,335	711,947
Silver-cobalt ores—							
Mine bullion shipped.....						232	3,410,936
Ore and concentrate.....	25	1,008	1,531	2,363,414	588,404	61,362	8,326,776
Nickel-copper ores.....	9	857	1,745	2,202,536	1,364,048	1,372,724	10,552,673
Copper ores.....	6	173	205	215,065	141,758	142,121	1,026,562
Silver-lead and zinc ores.....	66	328	784	960,894	215,694	73,752	2,958,394
Zinc products.....						14,895	540,022
Gold-copper-silver ores.....	33	886	1,694	2,868,449	2,380,709	2,186,646	10,947,059
Placer mining—							
Yukon.....						9	4,776,145
British Columbia.....							770,000
Alberta.....							4,026
Total metalliferous.....	205	12,698		11,805,919	6,138,150	4,259,734	53,864,518
Total non-metalliferous.....	472	30,392		20,257,126	16,594,889	14,481,882	43,373,571
Total structural materials.....	943	13,786		5,657,717			17,920,759
	1,618	56,876		37,720,762			115,158,848

Mine Production 1915, Content of Shipments.

	Gold.	Silver.	Nickel.	Copper.	Lead.	Zinc.	Antimony.
	Ozs.	Ozs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Antimony ore.....							1,080,196
Milling gold ore—							
Bullion.....	430,981	87,116					
Concentrates.....	35,779	37,507					
Silver-cobalt ores—							
Mine bullion shipped.....		6,752,183					
Ore and concentrate.....		17,603,943					
Nickel-copper ores.....			87,782,224	46,636,547			
Copper ores.....	1,151	64,965		7,075,858			
Silver-lead zinc ores.....	459	2,637,444			48,708,005		
Zinc products.....		316,731				12,231,439	
Gold-copper-silver ores.....	202,127	849,784		69,516,485			
Placer mining—							
Yukon.....	229,803	25,689					
British Columbia.....	37,249						
Alberta.....	195						
Total.....	937,744	28,375,362	87,782,224	123,228,890	48,708,005	12,231,439	1,080,196

Labour and Wages Statistics Covering Non-Metalliferous Mines During 1913, 1914, and 1915.

	1913.			1914.			1915.		
	No. active mines or works.	No. employed.	Wages paid.	No. active mines or works.	No. employed.	Wages paid.	No. active mines or works.	No. employed.	Wages paid.
NON-METALLIC.									
Asbestos and asbestic.....	10	2,951	\$ 1,687,957	10	2,992	\$ 1,283,977	9	2,394	\$ 1,091,076
Chromite.....	236	27,917	22,065,141	231	(b)	19,060,011	6	204	116,339
Coal.....	5	78	33,900	5	27,571	19,060,011	255	24,574	17,385,200
Feldspar.....	6	135	63,714	4	104	29,197	6	87	21,173
Graphite.....	5	125	27,500	5	135	47,776	5	110	40,643
Grindstones, pulpstones, scythestones.....	18	1,409	641,735	16	1,149	552,192	4	110	18,996
Gypsum.....	27	209	85,334	30	(b)	552,192	16	1,152	468,612
Magnesite.....	4	64	25,818	4	232	78,646	4	110	23,607
Mica and phosphate.....	14	79	36,639	18	73	21,146	23	138	47,372
Mineral pigments: barytes, and ochres.....	78	547	614,425	92	64	32,058	4	61	24,197
Natural gas.....	2	37	5,000	2	561	474,293	17	50	23,066
Peat.....	6	151	131,161	8	(b)	165,001	88	619	511,967
Pyrites.....	6	130	69,441	8	214	165,001	1	18	3,200
Quartz.....	12	251	178,386	11	81	33,872	7	207	172,986
Salt.....	6	133	85,997	9	253	178,277	6	122	78,747
All others†.....	435	34,207	25,752,148	451	148	67,130	11	254	186,059
Total non-metalliferous.....					33,732	22,058,526	10	182	43,886
STRUCTURAL									
Cement.....	27	4,276	3,466,451	24	2,977	2,271,006	472	30,392	20,257,126
Clay products.....	456	11,218	4,696,801	419	8,339	3,201,380	20	1,686	1,184,459
Lime.....	77	1,076	577,841	85	1,015	518,331	349	4,405	1,452,828
Sand-lime brick.....	22	589	289,398	21	467	190,031	78	633	293,735
Sand and gravel.....	110	1,042	607,554	254	2,382	821,601	18	177	41,043
Slate.....	1	35	12,544	1	20	7,150	241	1,721	491,830
Stone.....	218	6,131	3,219,465	219	5,929	2,871,817	1	20	5,520
Total structural.....	911	24,367	12,870,054	1,023	21,129	9,881,316	236	5,144	2,188,302
Total non-metalliferous.....	1,346	58,574	38,622,202	1,474	54,861	31,939,842	943	13,786	5,657,717
							1,415	44,178	25,874,670

†Includes in 1913—actinolite, corundum, tripolite and talc.
 " " 1914—actinolite, chromite, corundum, magnesite, manganese, peat, talc, and tripolite.
 " " 1915—actinolite, corundum, manganese, talc, and tripolite.

(a) Estimated for 1915. (b) Included in 'All other.'

SMELTER PRODUCTION.

Statistics of the production of copper, lead, and silver smelters and refineries, showing the tonnage of ore treated, the matte, blister, base bullion, or refined metal produced, etc., have been collected by this Branch since 1908.

The smelting companies in 1915 were as follows:—

Antimony Smelter:—

New Brunswick Metals, Ltd., Lake George, N.B.

Copper Smelters:—

Consolidated Mining and Smelting Co. of Canada, Ltd., Trail, B.C.

Granby Consolidated Mining, Smelting and Power Co., Ltd., Grand Forks and Anyox, B.C.

British Columbia Copper Co., Ltd., Greenwood, B.C.

Tyee Copper Company, Ltd., Ladysmith, B.C. (idle since 1911).

Nickel-Copper Smelters:—

Mond Nickel Co., Ltd., Coniston, Ont.

Canadian Copper Company, Copper Cliff, Ont.

Lead Smelters:—

North American Smelting Co., Kingston, Ont. (idle since 1913).

Consolidated Mining and Smelting Co. of Canada, Ltd., Trail, B.C.

Silver-Cobalt-Nickel Smelters:—

Coniagas Reduction Co., Ltd., Thorold, Ont.

Deloro Mining and Reduction Co., Ltd., Deloro, Ont.

Metals Chemical Co., Ltd., Welland, Ont.

Standard Smelting and Refining Co., Chippewa, Ont.

Zinc Smelters:—

Electro-Zinc Co., Welland, Ont.

Consolidated Mining and Smelting Co., of Canada, Ltd., Trail, B.C.

French Complex Ore Reduction Co. (Experimental).

The antimony smelter at St. George, N.B., was in operation for a short time only, while the zinc reduction had not passed definitely beyond the experimental stage in so far as actual production is concerned. The Consolidated Mining and Smelting Co., had, however, attained a production of about $\frac{1}{2}$ ton of spelter per day and had well under way the building and equipment of works to have a capacity of 45 tons of spelter per day. The zinc refinery buildings include structures for grinding, roasting, leaching, electrolyzing and melting plants, motor generator building, and trans-

former station, together with flue systems, Cottrell dust collecting plant, and a concrete stack 200 feet high and 12 feet inside diameter. The zinc plant at Welland, Ont., has been designed primarily for the recovery of metallic zinc from zinc oxide though it is intended ultimately to equip the plant for the treatment of zinc ore.

With the exception of zinc the total quantity of ores and concentrates treated in these smelters during 1915 was 3,624,582 tons (including 94,688 tons of imported ore), as compared with 2,650,155 tons (including 58,894 tons of imported ores) in 1914, and 3,027,291 tons in 1913.

The largest proportion of the total tonnage (61·9 per cent in 1915) consists as usual of the copper-gold-silver ores of British Columbia, chiefly from the Boundary (Phoenix and Greenwood) Rossland and Coast (Texada Island and Granby Bay) districts. The nickel-copper ores of the Sudbury district, Ontario, contributed about 35 per cent of the total tonnage, the balance being lead ores and other ores treated in lead furnaces and the silver-cobalt ores of Ontario treated in silver smelters. Gold and silver ores treated by cyanide processes are not included in this record.

The quantities of the several classes of ores smelted during the past eight years have been as follows:—

Tons of Ores Smelted, 1908-1915.

Year.	Nickel-copper ores.	Silver-cobalt ores.	Lead ores.	Copper-gold-silver ores.	Totals.
1908.....	360,180	7,182	53,545	1,797,488	2,218,395
1909.....	462,336	8,384	54,539	1,850,889	2,376,148
1910.....	628,947	9,466	57,549	1,987,752	2,683,714
1911.....	610,834	9,330	55,408	1,517,981	2,193,553
1912.....	725,065	8,097	59,932	2,212,316	3,005,410
1913.....	823,403	6,124	78,010	2,119,754	3,027,291
1914.....	947,053	5,681	71,224	1,626,197	2,650,155
1915.....	1,272,283	7,526	99,528	2,245,245	3,624,582

The products obtained in Canada from the treatment of these ores include: pig lead, produced at Kingston, Ont. (furnace idle in 1914 and 1915) refined pig lead and lead pipe produced at Trail, B.C.; fine gold, fine silver, copper sulphate and antimony, produced from the residue of the Trail lead refinery; silver bullion, white arsenic, metallic arsenic, metallic nickel, metallic cobalt, nickel oxide, cobalt oxide, nickel sulphate, cobalt sulphate and cobalt alloys produced in Ontario from the Cobalt District ores.

In addition to these refined products, blister copper, copper matte, and nickel-copper matte are produced and exported for refining.

The aggregate results of smelting and refining operations may be summarized as shown in the next table. Unfortunately the figures cannot be taken to represent the total production from smelting ores mined in Canada, since considerable quantities of copper and silver ores are still shipped to

other smelters outside of Canada for smelting, nor do these represent the entire recovery of these metals in Canada in metallic form since there is considerable recovery of both gold and silver bullion as a result of milling, amalgamation and cyanide treatment.

It should also be noted that the figures include the results of the treatment in British Columbia of a small quantity of imported ores.

Smelter and Refinery Production in Canada.

Refined products produced.	Calendar Years.					
	1910.	1911.	1912.	1913.	1914.	1915.
Antimony.....Lbs.						59,440
Gold.....Ozs.	13,298	15,270	12,118	11,977	11,088	17,813
Silver....."	16,373,799	19,078,768	17,572,217	13,789,709	11,096,861	12,248,415
Lead.....Lbs.	32,987,508	23,525,050	35,893,190	37,923,043	36,443,706	43,518,618
Copper sulphate....."	163,228	197,187	87,110	130,533	152,060	175,579
Cobalt metallic....."						211,610
Cobalt oxide....."		154,174	349,054	660,079	899,027 ⁽¹⁾	423,717
Nickel oxide....."				268,304	392,512 ⁽²⁾	272,025
Nickel, metallic....."						55,325
White arsenic....."	3,003,467	4,194,209	4,090,768	3,384,249	3,474,322	4,792,637

Matte, blister copper, and other smelter products obtained and exported for refining.

	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
⁽³⁾ Blister copper.....	13,918	10,710	17,063	15,270	13,238	22,263
⁽⁴⁾ Copper matte.....	11,519	11,320	6,727	5,159	6,291	7,619
⁽⁵⁾ Nickel-copper matte.....	33,033	32,607	41,925	47,150	46,396	67,703
⁽⁶⁾ Cobalt material.....	54	630	642	122	101	.....

Metals contained in above unrefined smelter products.

Gold.....Ozs.	197,181	175,189	184,815	213,279	170,818	182,051
Silver....."	2,136,414	585,896	686,171	934,601	873,400	855,519
Copper.....Lbs.	56,149,299	29,855,868	58,405,910	59,245,722	59,237,016	88,679,451
Nickel....."	37,587,676	34,098,744	44,841,542	49,676,772	45,517,937	68,077,823

⁽¹⁾ Includes a small quantity of cobalt sulphate.

⁽²⁾ Includes a small quantity of nickel sulphate.

⁽³⁾ Blister copper carrying gold and silver values.

⁽⁴⁾ Copper matte carrying gold and silver values.

⁽⁵⁾ Bessemer nickel-copper carrying small gold and silver values as well as metals of the platinum group.

⁽⁶⁾ Cobalt material carrying nickel and silver values.

Nickel-Copper Ores.—These ores of the Sudbury district, together with a small tonnage from the Alexo mine in the district of Timiskaming, Ontario, are treated in the smelters of the Canadian Copper Company at Copper Cliff, and the Mond Nickel Company at Coniston, formerly at Victoria Mines. In addition to the nickel and copper which will probably average slightly over 3 per cent nickel, and 2 per cent copper, these ores of the Sudbury district contain small amounts of gold, silver, platinum, and palla-

dium. The present metallurgical practice involves the following processes:—

- I. Roasting the ores in open heaps, to remove part of the sulphur.
- II. Smelting in water-jacketed blast furnaces, to produce a low grade matte, containing 33 per cent copper-nickel and nearly all the precious metals.
- III. Converting the furnace matte in Bessemer basic converters, to make a matte containing about 80 per cent copper-nickel.
- IV. Refining the converter matte, separating the nickel-copper, and precious metals.

At the present time the first three processes only are carried on in Canada. The converter matte is shipped to the United States and to England for final treatment.

The Copper Cliff plant, includes: seven blast furnaces, capacity 3,000 tons of ore per day; five basic converter stands; two McDougall reverberatories and four Wedge roasting furnaces.

At the Coniston plant there are three furnaces with a total capacity of from 1,600 to 1,800 tons of ore per day; three Pierce-Smith standard basic converters with an output capacity of 20 tons each of Bessemer matte.

The total quantity of nickel-copper ore mined during 1915 was, 1,364,048 tons and the quantity smelted 1,272,283 tons. There were produced 67,703 tons of Bessemer matte, containing 19,608 tons of copper and 34,039 tons of nickel. This is the largest production since the beginning of operations in 1886.

The total quantity of nickel-copper ore mined during 1914 was 1,000,364 tons and the quantity smelted 947,053 tons. There were produced 46,396 tons of Bessemer matte, containing 14,448 tons of copper and 22,759 tons of nickel.

Statistics of smelter production from these ores since the commencement of this industry are shown in the following table:—

Smelter Production of the Nickel-Copper Ores of the Sudbury District.

(IN SHORT TONS.)

Calendar Year.	Ore mined.	Ore smelted.	Matte shipped.	Value matte.	Nickel content of matte.	Copper content of matte.
1886.....	3,307					
1887.....	567	30,000			900	1,500
1888.....						
1889.....	44,990	40,146	3,274		432	733
1890.....					718	651
1891.....	83,300	72,558	10,336		2,018	2,064
1892.....	74,381	57,022			1,207	1,102
1893.....			9,425		1,991	1,821
1894.....	103,223	96,038	11,681	\$ 766,422	2,454	2,604
1895.....	74,135	68,618	10,188	890,834	1,944	2,288
1896.....	94,966	71,027	10,759	416,594	1,699	1,584
1897.....	93,154	96,370	13,968		1,999	2,750
1898.....	123,820	121,924			2,759	4,187
1899.....	159,957	172,761		702,341	2,872	2,834
1900.....	196,420		23,336	1,076,306	3,540	3,364
1901.....	315,692	255,958		1,661,839	4,594	4,318
1902.....	269,538	211,847	25,311	1,327,448	5,347	3,553
1903.....	136,033	207,030	13,832	2,686,469	6,253	3,576
1904.....	203,388	118,470	10,154	2,193,198	5,274	2,455
1905.....	277,766	251,421	17,405	4,019,814	9,438	4,386
1906.....	343,814	340,059	20,310	4,628,011	10,745	5,264
1907.....	351,916	359,076	22,025	3,289,382	10,595	6,996
1908.....	409,551	360,180	21,210	2,930,989	9,572	7,503
1909.....	451,892	462,336	25,845	1,913,012	13,141	7,873
1910.....	652,392	628,947	35,033	5,380,064	18,636	9,630
1911.....	612,511	610,834	32,607	4,945,593	17,049	8,966
1912.....	737,726	725,065	41,925	6,303,102	22,421	11,116
1913.....	784,697	823,403	47,150	7,076,945	24,838	12,938
1914.....	1,000,364	947,053	46,396	7,189,031	22,759	14,448
1915.....	1,364,048	1,272,283	67,703	10,352,344	34,039	19,608

Silver-Copper-Nickel-Arsenic Ores.—The first shipments of silver ores from the Cobalt district were made in 1904, and in 1906 the first works for the treatment of these ores in Canada were established by the Canadian Copper Company, at Copper Cliff, Ont. This plant was closed down, however, in 1913. Operations have been continuous at the plants of the Coniagas Reduction Company, at Thorold, and the Deloro Mining and Reduction Company, at Deloro, Ont., while during the past two years Metals Chemical Company have operated a small plant at Welland, Ont. In addition to the above there have been in previous years intermittent operations at plants established at Kingston, Orillia, and North Bay, Ont. The products recovered in the plants now operating, include: refined silver, arsenious oxide, metallic arsenic, metallic cobalt, metallic nickel, cobalt oxide, nickel oxide, cobalt sulphate, nickel sulphate and cobalt alloys.

The tonnage of ore treated in these smelters in 1915 was 7,526 tons, as against 5,681 tons in 1914 and 9,466 tons in 1910. The recoveries in 1915 included: 9,885,986 fine ounces of silver in bullion; 4,792,637 pounds of

arsenious oxide; 504,212 pounds of cobalt as metal or contained in cobalt salts, and 231,634 pounds of nickel as metal or contained in nickel salts.

Lead Smelters.—The lead smelter and refinery at Trail, B.C., owned by the Consolidated Mining and Smelting Company, was the only lead smelter operated during 1915. The small plant at Kingston, Ontario, built by the North American Smelting Company, and completed in 1912 was operated in 1913, but remained idle throughout 1914 and 1915.

The Trail plant now includes a new lead ore sampling mill, Wedge roasting furnaces, Huntingdon Heberlein converters; four lead furnaces with Cottrell dust collecting plant; electrolytic lead refinery, and lead pipe plant. The total capacity of the plant is about 125 tons of refined lead per day.

In the lead refinery, the bullion from the smelter is cast into anodes and re-deposited electrolytically upon cathode sheets of refined lead. The refined lead is cast into pigs or manufactured into lead pipe. The slimes from the tank room carry gold, silver, antimony, arsenic, and copper.

The first two are recovered as fine metals, and the copper as copper sulphate. Antimony is also recovered, though not regularly, and bearing metal is manufactured.

Amongst the improvements at the lead plant during the Company's first year ending September 30, are included:—

"Purchase of the rights to use the Cottrell patents and the building and the extension of the Cottrell plants for the lead roasters and furnaces. The saving from the use of these plants is very great already and will be greater after some alterations in the electrical equipment."

"An additional lead furnace with the necessary flues and extension to the furnace building."

"An additional crane in the Huntingdon and Heberlein plant."

"Wash houses for men working around the lead plant."

"New lead sampling mill."

"Rebuilding tanks and alterations to the lead refinery."

The annual production of refined lead, fine gold and silver, and copper sulphate has been as follows:—

Production of Refined Lead, Fine Gold, and Silver in Lead Smelters.

Calendar Year.	Refined lead.	Fine gold.	Fine silver.	Copper sulphate.
	Lbs.	Ozs.	Ozs.	Lbs.
1904.....	7,519,440	4,336	551,450	56,000
1905.....	15,804,509	8,602	1,088,328	77,175
1906.....	20,471,314	9,993	1,263,809	143,135
1907.....	26,607,461	10,395	1,631,422	97,751
1908.....	36,549,274	15,346	1,956,039	203,379
1909.....	41,883,614	18,241	2,003,003	51,405
1910.....	32,987,508	13,298	1,798,960	163,228
1911.....	23,525,050	15,270	1,325,601	197,187
1912.....	37,008,490	12,118	1,896,999	87,110
1913.....	39,663,766	11,977	2,433,002	130,533
1914.....	36,443,706	11,088	2,043,868	152,060
1915.....	43,518,618	17,813	2,362,429	175,579

Gold-Silver-Copper Ores of British Columbia.—Four copper smelters were active in British Columbia during 1915. These were the Trail copper furnace of the Consolidated Mining and Smelting Company treating the ores of the Rossland camp and other ores of the district; the Grand Forks plant of the Granby Consolidated Mining, Smelting and Power Co.; the Greenwood plant of the British Columbia Copper Company, treating chiefly the low grade ores of the Boundary district, and the Anyox plant of the Granby Consolidated Company, treating the ores of the Hidden Creek mines at Anyox and other coast properties.

On the coast, the Tyee Copper Company's furnace at Ladysmith was idle throughout the year.

The aggregate production of British Columbia copper smelters during the past four years, including the foreign ores treated, was as follows:—

Production of British Columbia Copper Smelters.

	1912.	1913.	1914.	1915.
Ore smelted.....Tons	2,212,316	2,119,754	1,612,197	2,245,245
Smelter products—				
Matte....."	6,727	5,159	6,291	7,619
Blister....."	17,069	15,270	13,238	22,263
Metallic content of matte and blister—				
Gold.....Ozs.	184,815	213,279	170,818	182,051
Silver....."	686,171	934,601	873,400	855,519
Copper.....Lbs.	36,174,185	33,370,176	30,341,191	49,463,286

Trail Smelter.—Statistics of the production of the Trail smelter including both the copper and lead furnaces, have been published in the annual reports of the Company, the figures since 1906 having been as follows:—

Production of Trail Smelter

Fiscal Year.	Ore smelted.	METALS CONTAINED IN MATTE AND BULLION PRODUCED.			
		Gold.	Silver.	Lead.	Copper.
	Tons.	Ozs.	Ozs.	Lbs.	Lbs.
1906 (6 months), ending June 30th.....	157,640	64,590	1,074,255	15,133,683	2,399,161
1907, ending June 30th.....	222,573	69,168	1,100,271	20,283,083	3,443,310
1908 " ".....	305,956	121,380	2,224,888	32,157,139	4,004,468
1909 " ".....	347,417	114,920	2,443,475	43,675,077	4,637,631
1910 " ".....	487,125	137,614	2,162,406	42,368,816	5,974,959
1911 " ".....	388,785	119,067	1,458,758	24,026,015	4,421,988
1912 " ".....	296,458	129,789	1,765,992	26,072,074	2,914,141
1913 (15 mos. to Sept. 30, 1913).....	407,124	186,017	3,224,408	48,325,252	3,454,814
1914 ending Sept. 30.....	374,771	129,083	2,568,301	34,617,318	3,645,997
1915 " ".....	447,064	148,891	2,230,500	40,177,910	5,306,184
Total 1894 to date.....	4,372,886	1,610,903	22,247,832	374,091,124	63,196,978

The Trail copper smelting plant now includes: five furnaces with a daily capacity of 3,000 tons of ore. There was being installed during 1915,

now recently completed, a converter plant comprising two Great Falls type converters, 12 feet in diameter also an electrolytic copper refinery with an initial daily capacity of 10 tons of refined copper, sufficient to handle the output of the smelters and converters. The slimes from the refinery will be re-treated for the recovery of gold and silver values.

Granby and Anyox Smelters.—The Granby smelter is situated at Grand Forks in the Boundary district, and the Anyox smelter at Observatory inlet, Portland canal; both are owned by the Granby Consolidated Mining, Smelting and Power Company. The ores treated at Grand Forks are those from the Company's mines at Phoenix, together with a small tonnage of custom ore; while at the Anyox smelter the ores from the Hidden Creek mine and other coast properties are reduced.

The Phoenix ores have been of particular interest because of the low tenor of their metal values, their self-fluxing character, and the large tonnage treated. The percentage of metals contained has been decreasing and the recovery of metals from Phoenix mine ores, during the year ending June 30, 1915, as shown in the Company's annual report was: copper 16.12 pounds; silver 0.191 ounces; and gold 0.0382 ounces per ton of ore smelted.

During the first year of operation 1900–1901, the recovery from 172,258 tons of ore smelted was 31.49 lbs. of copper, 0.4406 ounces of silver and 0.1003 ounces of gold per ton of ore stripped, according to a statement in the Company's report for 1910.

The first furnace of 300 tons capacity was completed in 1900 and since that date the capacity of the plant has been increased from time to time until at present there are eight furnaces with a total capacity of about 4,500 tons per day. The converter plant was first installed in 1902, and enlarged in 1909 and includes: 3 stands and 10 shells with a daily capacity of 100,000 pounds of blister.

The ore at the Hidden Creek mines, Anyox, is higher in copper than the Phoenix ores. Recoveries during the Company's fiscal year ending June 30, 1915, when the quantity smelted was 462,340 tons, were 34.58 pounds of copper; 0.3087 ounces of silver, and 0.00796 ounces of gold per ton.

At Anyox "the furnaces, of which there are four (with a total daily capacity of 3,000 tons) are 50 inches wide by 30 feet long, and are the regular type of rectangular water-jacketed matting furnace made by the Traylor Engineering & Mfg. Co.; an agglomerator for handling converter slag and matte has also been installed. The converter room is in one end of the main smelter building, in which are three converter stands. The converters of the Great Falls type are 12 feet in diameter.

The quantities of ores smelted and the total production of metals shown in the accompanying table, are compiled from the Company's annual published reports.

Ores treated at Grand Forks and Anyox, during the twelve months ending June 30, 1915.

ORES OF	Ore smelted. Dry tons.	Lbs. Cu. recovered per ton ore.	Metals recovered and sold.		
			Copper. Lbs. fine.	Silver. Ozs. fine.	Gold. Ozs. fine.
Phoenix Mines.....	611,097	16.12	9,850,302	116,752	23,355
Anyox Mines.....	462,340	34.58	15,895,757	142,725	3,581
Both plants.....	1,073,437	23.99	25,746,059	259,477	26,936
Foreign ores purchased.....	24,583		892,853	118,404	4,452
Total.....	1,098,020		26,638,912	377,881	31,388

The following table shows the annual recoveries since 1901.

Ores Smelted and Metals Recovered at Granby Smelters.

Year ending June 30.	ALL MATERIALS SMELTED.					METALS PRODUCED.		
	Granby ore.		Foreign.		Total.	Gold.	Silver.	Copper.
	Anyox.	Phoenix.	Ore.	Matte.				
	Tons.	Tons.	Tons.	Tons.	Tons.	Ozs.	Ozs.	Lbs.
1901.....		169,087	7,832		176,919	8,871	34,990	5,435,955
1902.....		293,645	4,454	3,001	301,100	30,786	274,511	10,836,851
1903.....		289,583	7,691	6,223	303,497	35,121	277,574	12,551,758
1904.....		516,059	36,182	4,290	556,531	54,493	275,935	16,020,986
1905.....		550,738	39,382		590,120	42,980	215,449	14,224,692
1906.....		796,188	36,158		832,346	50,020	316,947	19,939,004
1907.....		649,022	16,893		665,915	32,738	201,337	16,410,576
1908.....		858,432	24,179		882,611	40,068	300,204	21,092,288
1909.....		964,789	19,944		984,733	45,760	335,520	21,901,528
1910.....		1,175,548	21,829		1,197,377	48,752	356,746	22,754,899
1911.....		959,563	24,783		984,346	41,707	343,178	17,858,860
1912.....		721,719	17,800		739,519	33,932	225,305	13,231,121
1913.....		1,264,690	15,179		1,279,869	47,266	324,336	22,688,614
1914.....	63,105	1,201,955	23,940		1,289,000	43,882	435,275	23,320,097
1915.....	462,340	611,097	24,583		1,098,020	31,388	377,881	26,638,912
Total.....	525,445	11,022,115	320,829	13,514	11,881,903	587,764	4,295,188	264,906,141

Greenwood Smelter.—The plant of the British Columbia Copper Company, at Greenwood, B.C., includes three large furnaces, having a total daily capacity of from 2,400 to 2,500 tons, and a converter plant of 2 stands and 7 shells with a capacity of about 35,000 pounds of blister copper per day.

The last annual published report of the Canada Copper Corporation, Ltd., which controls the British Columbia Copper Company, covering the year ending December 31, 1915, contains the following references to smelting operations:—

"Average metallurgical conditions were fair during the period of operation. A slightly reduced tonnage per furnace over former operations was obtained, due to running a more refractory charge than formerly. The supply of ore available only permitted the operation of one furnace.

The total amount of ore smelted during the period under review was 122,514 tons, dry weight, and consisted of:—

Company ores.....	115,140 tons dry weight.
Custom ores.....	7,374 " "

The coke used represented 14.44% of the total charge and averaged 22% in ash.

The time of actual operation was 158 furnace days and the actual amount of ore smelted per day per furnace was 775.4 tons. The work was performed by an average of 49.2 men per day with an average wage of \$3.48 per day.

There were produced 1,850 tons of matte, averaging 48% copper per ton. The amount of slag made was 105,280 tons, containing 0.0043 ozs. gold per ton; 0.072 ozs. silver per ton; and 0.286% copper.

The balance of the analysis was as follows:—

Silica, 38.5%; iron 23.5%, lime 20.5%.

The production of metals amounted to:—

Copper (fine).....	1,734.385 pounds
Silver.....	23,002.62 ounces
Gold.....	5,417.0839 ounces."

Ladysmith Smelter.—This smelter which has not been operated since 1911 is owned by the Tyee Copper Company, Ltd., and located at Ladysmith, Vancouver island, B.C. The plant includes: two furnaces with a total daily capacity of 500 tons of ore. When in operation the copper matte produced averaged 40–43 per cent copper.

METALLIC ORES.

ALUMINIUM.

No commercial ores of aluminium have as yet been found in Canada. Aluminium, is, however, made in extensive works at Shawenegan Falls, Quebec, from bauxite ores imported from France, the United States and also formerly from Germany, by the Northern Aluminium Company. A wire mill for the manufacture of aluminium wire and cables is also operated by the same firm.

There being but one firm engaged in the manufacture of aluminium we are precluded from publishing statistics of production.

Imports of alumina, probably including bauxite, and exports of aluminium are, however, published in the reports of the Department of Customs.

During the twelve months ending December 31, 1915, the imports of alumina were 35,016,200 pounds, or 17,508 tons valued at \$892,634, as against 28,557,000 pounds, or 14,279 tons, valued at \$571,419 in 1914. The imports of aluminium in ingots, bars, etc., were in 1915, 2,667,355 pounds, or 1,334 tons, valued at \$633,502, besides manufactures of aluminium valued at \$88,733, compared with 3,812,128 pounds, or 1,906 tons of aluminium in ingots, bars, etc., valued at \$752,753, and manufactures of aluminium valued at \$107,598, in 1914.

The exports of aluminium, ingots, bars, etc., in 1915 amounted to 18,680,800 pounds, valued at \$3,333,726, together with manufactures of aluminium valued at \$620,562, as against 14,510,800 pounds valued at \$2,364,907 and manufactures valued at \$5,571 in 1914.

The imports of alumina and exports of aluminium during the past ten years, and the imports of aluminium during the past five years, are shown in tabular form as follows:—

Annual Imports of 'Alumina' and Exports of Aluminium.

Calendar Year.	Imports of alumina.		EXPORTS OF ALUMINIUM.		
			Ingots, bars, etc.		Manufactures.
	Pounds.	Value.	Pounds.	Value.	Value.
1905.....	5,360,800	\$138,765	2,535,386	\$ 508,219	\$1,588
1906.....	8,975,400	239,136	4,521,486	899,113	2,244
1907.....	12,705,300	268,502	5,478,203	1,109,353	1,499
1908.....	1,485,500	29,752	1,713,800	399,785	1,727
1909.....	11,794,100	234,544	6,134,500	918,195	3,453
1910.....	19,464,400	403,283	7,722,400	1,160,242	3,741
1911.....	18,607,200	372,009	4,990,100	747,587	1,555
1912.....	22,400,500	448,061	18,285,700	2,002,363	10,898
1913.....	30,704,200	614,713	13,015,000	1,762,214	8,203
1914.....	28,557,000	571,419	14,510,800	2,364,907	5,571
1915.....	35,016,200	892,634	18,680,800	3,333,726	620,562

Annual Imports of Aluminium.

Year.	Ingots, blooms, bars.		Tubing.		Manufactures.	Total value.
	Pounds.	Value.	Pounds.	Value.		
1910.....	3,180,250	\$ 674,683	10,019	\$ 4,203	\$ 77,664	\$ 756,550
1911.....	2,527,120	531,273	3,594	1,495	115,278	648,046
1912.....	2,396,375	410,022	11,624	3,654	120,029	533,705
1913.....	3,455,686	604,582	19,856	9,174	131,938	745,694
1914.....	3,796,353	745,855	15,775	6,898	107,598	860,351
1915.....	2,661,117	630,504	6,238	2,998	88,733	722,235

The price of aluminium in New York remained steady at about 19 cents per pound up to the middle of May, then gradually increased, reaching 60 cents in the latter part of 1915. This was due to the demand being so much in excess of the supply. There was a greatly increased consumption of aluminium in the manufacture of light aluminium alloys and in the manufacture of camping equipment of all kinds, aeroplanes and automobile parts.

The extreme demand in Europe has been attributed in part also to the increase in the use of ammonal, an explosive which is a mixture of nitrate of ammonia and powdered aluminium.

Average Monthly Price of Ingot Aluminium.¹

(At New York in cents per pound).

	1911.	1912.	1913.	1914.	1915.
January.....	20·13	19·13	26·31	18·81	19·08
February.....	21·25	19·44	26·04	18·81	19·22
March.....	21·15	19·58	27·05	18·50	19·00
April.....	20·75	20·38	27·03	18·16	18·88
May.....	20·55	21·69	26·44	17·95	22·03
June.....	20·03	22·83	24·68	17·75	30·00
July.....	20·20	23·50	23·38	17·66	32·38
August.....	20·02	24·38	22·70	19·88	34·50
September.....	19·34	25·13	21·69	19·94	47·75
October.....	18·75	26·25	20·13	18·50	50·00
November.....	18·79	26·56	19·35	18·00	57·75
December.....	18·85	25·75	18·88	18·96	57·13
	20·07	22·01	23·64	18·63	33·98

¹As quoted by the Engineering and Mining Journal.

ANTIMONY.

Shipments of both antimony ore and concentrates, and of refined antimony were made from Canadian properties during 1915, this being the first recorded production of antimony since 1910. Refined antimony was produced at the smelter of the Consolidated Mining and Smelting Company at Trail, B.C., recovered from the residues of the lead refinery and at the works of Lake George, New Brunswick, of the New Brunswick Metals, Limited, the latter property having been formerly operated by the Canadian Antimony Company. The production was reported as 59,440 pounds and has been valued at 20 cents per pound, or \$11,888. The shipments of antimony ore or concentrates, reported as 1,341 tons containing approximately 1,050,196 pounds of antimony and valued at \$81,283 were derived principally from the mines of the West Gore Antimony Company, at West Gore, Hants county, Nova Scotia. There were also small experimental shipments from the Alps-Alturas claims, Slocan Mining Division, owned by W. J. McMillan & Co., Vancouver, B.C., and from the Chinook Mountain group, Kiokook creek, near Kanaka, B.C., owned by W. S. Clark, Keefers, B.C., and a small shipment from Tagish lake, Yukon.

The annual production of antimony ore with the exports of antimony ore and imports of antimony are given in the following tables:—

Annual Shipments of Antimony Ore.

Year.	Tons.	Value.	Year.	Tons.	Value.
1886.....	665	\$ 31,490	1905 (a).....	527	.....
1887.....	584	10,860	1906 (a).....	782	.....
1888.....	345	3,696	1907 {	2,016	\$ 65,000
1889.....	55	1,100	*Refined antimony		5,108
1890.....	26½	625	1908 (b).....	148	5,443
1891.....	10	60	1909 {	35	1,575
1892 to 1897.....			*Refined antimony		4,285
1898.....	1,344	20,000	1910.....	364	13,906
1899 to 1904.....			1911-1914.....		.....
			1915 {	1,341	81,283
			*Refined antimony		11,888

(a) As recorded by the Nova Scotia Department of Mines; no value given.

(b) Exports.

*Refined antimony; 63,850 pounds in 1907, 61,207 pounds in 1909, and 59,440 pounds in 1915.

Exports of Antimony Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1880.....	40	\$ 1,948	1890.....	38	\$ 1,000	1905.....	525	\$ 27,118
1881.....	34	3,308	1891.....	3½	60	1906.....	420	17,064
1882.....	323	11,673	1892-1897.....			1907.....	1,327	37,807
1883.....	165	4,200	1898.....	1,232	15,295	1908.....	148	5,443
1884.....	483	17,875	1899.....	6½	190	1909.....	4	120
1885.....	758	36,250	1900.....	210	3,441	1910.....	239	14,095
1886.....	665	31,490	1901.....	10	1,643	1911.....	57	4,946
1887.....	229	9,720	1902.....	90	13,658	1912-1914.....		.....
1888.....	352½	6,894	1903.....	33	4,332	1915.....	1,149	82,990
1889.....	30	695	1904.....	160	7,237			

Imports of Antimony.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880.....	42,247	\$ 5,903	1892.....	180,308	\$ 17,680	1904.....	418,943	\$ 27,112
1881.....		7,060	1893.....	181,823	14,771	1905.....	186,454	12,828
1882.....	183,597	15,044	1894.....	139,571	12,249	1906.....	403,918	56,297
1883.....	105,346	10,355	1895.....	79,707	6,131	Calendar year.		
1884.....	445,600	15,564	1896.....	163,209	9,557	1907.....	534,104	88,530
1885.....	82,012	8,182	1897.....	134,661	8,031	1908.....	426,736	30,961
1886.....	89,787	6,951	1898.....	156,451	12,350	1909.....	591,530	41,731
1887.....	87,827	7,122	1899.....	289,066	16,851	1910.....	483,282	34,448
1888.....	120,125	12,242	1900.....	186,997	20,001	1911.....	579,466	38,823
1889.....	119,034	11,206	1901.....	350,737	24,714	1912.....	1,053,728	67,653
1890.....	117,066	17,439	1902.....	504,822	39,276	1913.....	690,699	51,829
1891.....	114,084	17,483	1903.....	868,146	65,434	1914.....	694,150	57,715
						1915.....	2,030,150	355,238
1915 { Antimony, or regulus of, not ground, pulverized or otherwise manufactured.....Duty free.							1,962,194	\$344,918
Antimony salts....."							67,956	10,320
Total.....							2,030,150	\$355,238

The average prices of antimony, as quoted by the "Engineering and Mining Journal," are shown in the following table:—

Average Prices of Antimony.

	1913.			1914.			1915.		
	Cookson's	U.S. ¹	Ordin-aries. ²	Cook-son's	U.S. ¹	Ordin-aries.	Cookson's	U.S. ¹	Ordin-aries. ²
January.....	9·94	9·53	8·97	7·388	7·110	6·125	17·90	.....	15·85
February.....	9·47	9·09	8·25	7·250	7·057	6·100	21·25	.....	18·21
March.....	9·28	8·85	8·18	7·315	7·073	6·053	28·75	.....	22·13
April.....	9·13	8·50	7·98	7·363	7·048	6·006	31·88	.....	24·88
May.....	8·88	8·37	7·79	7·365	7·020	5·845	42·70	.....	35·30
June.....	8·79	8·27	7·64	7·250	7·000	5·825	47·50	.....	37·69
July.....	8·54	8·08	7·55	7·210	6·940	5·638	50·44	.....	38·13
August.....	8·38	7·91	7·39	17·250	15·800	13·800	48·00	.....	33·00
September.....	8·37	7·93	7·37	11·830	.....	9·940	44·56	.....	28·63
October.....	7·60	7·27	6·49	14·680	.....	12·060	45·50	.....	31·45
November.....	7·62	7·30	6·45	17·750	.....	14·450	47·25	.....	38·88
December.....	7·50	7·25	6·13	16·130	.....	13·310	55·00	.....	39·25
	8·73	8·22	7·52	10·732	.....	8·763	40·06	.....	30·28

¹ United States brands.

² Hungarian, Chinese, or other "Foreign" brands.

The price of antimony, ordinary grades, in New York ranged between a minimum of 13 cents in January to a maximum of 42 cents in December, averaging 30·28 cents for the year.

The price of "Cooksons" in December was 55 cents per pound and the year's average 40·06 cents.

COBALT.

The silver-cobalt-nickel-arsenides of Coleman and adjacent townships, more familiarly known as the Cobalt district, in the Province of Ontario, are now the principal sources of the world's production of cobalt.

The recovery of this metal in Canada has been in the form of cobalt-oxide and mixed oxides of cobalt and nickel, produced by the smelters treating the above ores, together with cobalt residues produced at the high grade mill of the Nipissing Mining Company. Formerly these residues have been chiefly exported but they are now being shipped mainly to Canadian smelters.

In addition to the oxide of cobalt, there is now being recovered metallic cobalt, cobalt sulphate and stellite, the cobalt alloy used for high speed tool metal.

According to returns received there were produced in 1915, 211,610 pounds of metallic cobalt, valued at \$197,995, and 423,717 pounds of cobalt oxide, valued at \$338,273 (including a small production of cobalt sulphate).

Assuming the cobalt-oxide to average 70 per cent cobalt, the total production of the metal would approximate 504,212 pounds in 1915.

The actual shipments during 1915 were much less than the recoveries, considerable stocks being carried at the end of the year.

During 1914 there was recovered 899,027 pounds of cobalt-oxide, valued at \$571,710, while the production of mixed oxides of cobalt and nickel, together with the shipments abroad of cobalt residues, amounted to 2,079,001 pounds, valued at \$79,995, and containing 242,572 pounds of metallic cobalt. Assuming the cobalt-oxide to average 70 per cent cobalt the total production of the metal would approximate 871,891 pounds in 1914.

No record is available as to the recovery of cobalt from silver ores exported but it is stated that cobalt speiss has been accumulated at United States smelters treating these ores.¹

The production of cobalt-oxide, nickel-oxide and cobalt material during the past four years has been as follows:—

Production of Cobalt and Nickel-Oxides.

Year.	Cobalt oxide.		Nickel oxide.		Mixed oxides of cobalt and nickel and other cobalt material.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1912.....	257,677	\$128,843	91,377	\$ 9,137	1,285,280	\$163,988
1913.....	660,079	525,028	268,304	30,122	3,216,000	90,266
1914.....	899,027	571,710	392,512	34,883	2,079,001	79,995
1915.....	423,717	338,273	282,025	31,262	.....	.....

¹ Mineral Resources of the United States, 1913, p. 340.

The market for cobalt in 1915 was very poor. Prior to the war the principal demand was for colouring in the ceramic industry.

A small demand for cobalt metal now exists for use in making steel for high speed tools and for plating purposes. The market will likely strengthen as soon as conditions in Europe become normal.

The results of researches on cobalt and cobalt alloys, undertaken for the Mines Branch, by Dr. H. T. Kalmus, at Queens University, have been published in five parts.¹

Under the provision of the "Metal Refining Bounty Act," passed by the Ontario Legislature in 1907, bounties amounting to \$26,744.75 were paid to refineries on cobalt-oxide, and \$10,280.28 on nickel-oxide in 1914.

The bounty is at the rate of six cents per pound on the metallic contents of the oxides. The "Act" which expires in April, 1917, was quoted in the Annual Report on Mineral Production of Canada, during the Calendar Year 1914, and previous reports of this Division.

¹Mines Branch No. 259, "Preparation of Metallic Cobalt by Reduction of the Oxide." Report on, by H. T. Kalmus, B.Sc., Ph.D.

Mines Branch No. 309, "The Physical Properties of the Metal Cobalt." Report on, by H. T. Kalmus, B.Sc., Ph.D.

Mines Branch No. 334, "Electro-plating with Cobalt." Report by H. T. Kalmus, B.Sc., Ph.D., 1915.

Mines Branch No. 411, "Cobalt Alloys with Non-Corrosive Properties." Report on, by H. T. Kalmus, B.Sc., Ph.D.

Mines Branch No. 413, "Magnetic Properties of Cobalt and of Fe₂Co." Report on, by H. T. Kalmus B.Sc., Ph.D.

COPPER.

The total production of copper in Canada in 1915 estimated on the basis of smelter recovery from ores treated, was 100,785,150 pounds, which, at the average price of copper for the year in New York, 17.275 cents per pound, would be worth \$17,410,635, as against 75,735,960 pounds, valued at \$10,301,606 in 1914; that is, an increase of about 25 per cent in quantity and 41 per cent in value.

Since 1912 there had been a gradual falling off in quantity, and owing to the decrease in the price of the metal, a still greater falling off in value, but, due to the great demand for copper for munitions, the production in 1915 exceeded, both in quantity and value, that of any preceding year.

Statistics showing the annual copper production in Canada since 1886 are given in the following table, which shows the yearly increase or decrease as the case may be and also the yearly price per pound in New York:—

Annual Production of Copper.

Year.	Pounds.	INCREASE OR DECREASE.		Value.	INCREASE OR DECREASE.		Cents per pound.
		Pounds.	%		Value.	%	
1886.....	3,505,000			\$ 385,550			11.00
1887.....	3,260,424	(d) 244,576	6.99	366,798	(d) \$ 18,752	4.86	11.25
1888.....	5,562,864	2,302,440	70.60	927,107	560,309	152.70	16.66
1889.....	6,809,752	1,246,888	22.40	936,341	9,234	0.99	13.75
1890.....	6,013,671	(d) 796,081	11.69	947,153	10,812	1.15	15.75
1891.....	9,529,401	3,515,730	58.46	1,226,703	279,550	29.51	12.87
1892.....	7,087,275	2,442,126	25.63	818,580	(d) 408,123	33.27	11.55
1893.....	8,109,856	1,022,581	14.40	871,809	53,229	6.50	10.75
1894.....	7,708,789	(d) 401,067	4.94	736,960	(d) 134,849	15.46	9.56
1895.....	7,771,639	62,850	0.81	836,228	99,268	13.47	10.76
1896.....	9,393,012	1,621,373	20.86	1,021,960	185,732	22.21	10.88
1897.....	13,300,802	3,907,790	41.60	1,501,660	479,700	46.94	11.29
1898.....	17,747,136	4,446,334	33.43	2,134,980	633,320	42.17	12.03
1899.....	15,078,475	(d) 2,668,661	15.04	2,655,319	520,339	24.37	17.61
1900.....	18,937,138	3,858,663	25.59	3,065,922	410,603	15.46	16.19
1901.....	37,827,019	18,889,881	99.75	6,096,581	3,030,659	98.84	16.117
1902.....	38,804,259	977,240	2.58	4,511,383	(d) 1,585,198	26.00	11.626
1903.....	42,684,454	3,880,195	10.00	5,649,487	1,138,104	25.23	13.235
1904.....	41,383,722	(d) 1,300,732	3.05	5,306,635	(d) 342,852	6.07	12.823
1905.....	48,092,753	6,709,031	16.21	7,497,660	2,191,025	41.29	15.590
1906.....	55,609,888	7,517,135	15.63	10,720,474	3,222,814	42.98	19.278
1907.....	56,979,205	1,369,317	2.46	11,398,120	677,654	6.32	20.004
1908.....	63,702,873	6,723,668	11.80	8,413,876	2,984,244	26.18	13.208
1909*	52,493,863			6,814,754			12.982
1910.....	55,692,369	3,198,506	6.09	7,094,094	279,340	4.10	12.738
1911.....	55,648,011	(d) 44,358	0.79	6,886,998	(d) 207,096	2.92	12.376
1912.....	77,832,127	22,184,116	28.50	12,718,548	5,831,550	45.85	16.341
1913.....	76,976,925	(d) 855,202	1.10	11,753,606	(d) 964,942	7.59	15.269
1914.....	75,735,960	(d) 1,240,965	1.64	10,301,606	(d) 1,452,000	14.10	13.602
1915.....	100,785,150	25,049,190	24.85	17,410,635	7,109,029	40.83	17.275

*The decrease is not as large as the figures would indicate because of the calculation of part of the 1909 production on a different basis from previous years.

The production of copper in Canada in 1915 included 44,597 pounds recovered in copper sulphate; 42,050,347 pounds contained in blister

copper exported for refining; 44,185,455 pounds contained in matte, chiefly nickel-copper matte, exported for refining, and 14,504,751 pounds in ore, after allowing for smelter losses, exported for smelting and refining.

The total production in 1914 included: 38,508 pounds recovered in copper sulphate; 25,554,911 pounds in blister copper exported for refining; 32,782,973 pounds in "matte" exported for refining; and 17,359,568 pounds in ore, after allowing for smelter losses, also exported for smelting and refining.

The Province of British Columbia in 1915 contributed 56.2 per cent of the total production, as against 54.4 per cent in 1914. Ontario contributed in 1915 over 39 per cent of the total as against 38.2 per cent in 1914, and Quebec 4.1 per cent in 1915, as compared with 5.5 per cent in 1914.

Production of Copper by Provinces, 1913, 1914, and 1915.

Provinces.	1913.		1914.		1915.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Quebec.....	3,455,887	\$ 527,679	4,201,497	\$ 571,488	4,197,482	\$ 725,115
Ontario.....	25,885,929	3,952,522	28,948,211	3,937,536	39,361,464	6,799,693
British Columbia.....	45,791,579	6,991,916	41,219,202	5,606,636	56,692,988	9,793,714
Other districts.....	*1,843,530	281,489	†1,367,050	185,946	† 533,216	92,113
Total.....	76,976,925	11,753,606	75,735,960	10,301,606	100,785,150	17,410,635

*Includes Nova Scotia and Yukon. †Yukon only.

Prices.—The price of copper in New York, which was quoted at about 12.70 cents in the first days of 1915, rose steadily to 20 cents in the middle of June, it then decreased gradually to 15.75 cents in the last week in August, to again increase and reach a maximum of 22 $\frac{1}{4}$ cents in the last week in December.

The monthly average prices in New York and London are given in the following tables:—

Monthly Average Prices of Electrolytic Copper in New York.

(In cents per pound.)

Months.	1911.	1912.	1913.	1914.	1915.
January.....	12.295	14.094	16.488	14.223	13.641
February.....	12.256	14.084	14.971	14.491	14.394
March.....	12.139	14.698	14.713	14.131	14.787
April.....	12.019	15.741	15.291	14.211	16.811
May.....	11.989	16.031	15.436	13.996	18.506
June.....	12.385	17.234	14.672	13.603	19.477
July.....	12.463	17.190	14.190	13.223	18.796
August.....	12.405	17.498	15.400	*	16.941
September.....	12.201	17.508	16.328	*	17.502
October.....	12.189	17.314	16.337	*	17.686
November.....	12.616	17.326	15.182	11.739	18.627
December.....	13.552	17.376	14.224	12.801	20.133
Yearly average.....	12.376	16.341	15.269	13.602	17.275

*No quotations.

Monthly Average Prices of Standard Copper in London.

(In £ Sterling per ton of 2,240 pounds.)

Months.	1911.	1912.	1913.	1914.	1915.
January.....	55-604	62-760	71-741	64-304	60-756
February.....	54-970	62-893	65-519	65-259	63-494
March.....	54-704	65-884	65-329	64-276	66-152
April.....	54-035	70-294	68-111	64-747	75-096
May.....	54-313	72-352	68-807	63-182	77-600
June.....	56-368	78-259	67-140	61-336	82-574
July.....	56-670	76-636	64-166	60-540	76-011
August.....	56-264	78-670	69-200	*	68-673
September.....	55-253	78-762	73-125	*	68-915
October.....	55-176	76-389	73-383	*	72-601
November.....	57-253	76-890	68-275	53-227	77-744
December.....	62-063	75-516	65-223	56-841	80-773
Yearly average.....	55-973	72-942	68-335	61-524	72-532

*No quotations.

Exports and Imports.—With the exception of a small output of copper sulphate at Trail, B.C., the copper production of Canada is exported for refining. The exports of copper in ore, matte, regulus, etc., during the calendar year 1915 were 81,437,063 pounds, valued at \$8,671,641, of which 81·24 per cent in quantity and 86·66 per cent in value were exported to the United States, and 18·76 per cent in quantity and 13·34 per cent in value to Great Britain.

The exports of copper black or coarse and in pigs, were to the United States and amounted to 21,292,516 pounds, valued at \$3,788,715.

There was also an export of "old and scrap" copper amounting to 4,161,600 pounds and valued at \$616,553, distributed as follows: 95·08 per cent in quantity and 95·23 per cent in value to the United States, and 4·92 per cent in quantity and 4·77 per cent in value to Great Britain.

The total exports of copper in 1915, including "old and scrap" were 106,891,179 pounds valued at \$13,076,909, an increase of 38·10 per cent in quantity and 58·11 per cent in value over the exports in 1914.

Exports of Copper 1914 and 1915.

Destination.	Fine in ore, matte, regulus, etc.		Black or coarse and in pigs.		'Old and Scrap.'	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1915.						
United States.....	66,155,803	\$7,514,736	21,292,516	\$3,788,715	3,956,600	\$ 587,153
Great Britain.....	15,281,260	1,156,905			205,000	29,400
Other countries.....						
	81,437,063	\$8,671,641	21,292,516	\$3,788,715	4,161,600	\$ 616,553
1914.						
United States.....	57,923,363	\$6,287,439	6,581,564	\$908,201	1,660,400	\$189,793
Great Britain.....	10,906,696	843,339			275,100	35,918
Other countries.....					51,600	5,999
	68,830,059	\$7,130,778	6,581,564	\$ 908,201	1,987,100	\$231,710

Exports of Copper in Ore, Matte, etc., from 1885 to 1915.

Calendar Year.	Pounds.	Value.	Calendar Year.	Pounds.	Value.
1885.....		\$ 262,600	1901.....	32,488,872	\$3,404,908
1886.....		249,259	1902.....	26,094,498	2,476,516
1887.....		137,966	1903.....	38,364,676	3,873,827
1888.....		257,260	1904.....	38,553,282	4,216,214
1889.....		168,457	1905.....	40,740,861	5,443,873
1890.....		398,497	1906.....	42,398,538	7,303,366
1891.....		348,104	1907.....	54,688,450	8,749,609
1892.....		277,632	1908.....	51,136,371	5,934,559
1893.....	4,792,201	269,160	1909.....	54,447,750	5,832,246
1894.....	1,625,389	91,917	1910.....	56,964,127	5,840,553
1895.....	3,742,352	236,965	1911.....	55,287,710	5,467,725
1896.....	5,462,052	281,070	1912.....	78,488,564	9,036,479
1897.....	14,022,610	850,336	1913*.....	85,147,560	9,927,814
1898.....	11,572,381	840,243	1914*.....	77,398,723	8,270,689
1899.....	11,371,766	1,199,908	1915*.....	106,891,179	13,076,909
1900.....	23,631,523	1,741,885			

*Includes "Old and Scrap."

The total imports of copper during the calendar year 1915 were valued at \$3,957,770 and included: crude and manufactured copper 20,245,407 pounds, valued at \$3,593,818; copper sulphate 1,854,850 pounds, valued at \$99,282; and the manufactures of copper, valued at \$264,670.

The following tables of imports show a decrease of about \$300,000, as compared with 1914 and the imports of 1915 are only about 53 per cent of those in 1913.

Imports of Copper 1914 and 1915.

	1914.		1915.	
	Pounds.	Value.	Pounds.	Value.
Copper, old and scrap.....	127,800	\$ 15,717	68,500	\$ 8,281
Copper in pigs, ingots or in blocks.....	3,733,300	507,499	4,771,200	777,533
Copper in bars, and rods, in coils, or otherwise, in lengths, not less than 6 feet, unmanufactured....	18,212,300	2,689,940	11,989,400	2,082,182
Copper, in strips, sheets or plates, not planished or coated, etc.....	3,373,100	574,783	2,668,400	534,926
Copper tubing in lengths not less than 6 feet and not polished, bent or otherwise manufactured.....	696,444	159,602	670,337	173,896
Copper rollers, for use in calico printing.....		22,301		2,777
Copper and manufactures of:—				
Nails, tacks, rivets and burrs or washers.....		4,445		8,661
Wire, plain, tinned or plated.....	137,871	35,781	77,383	16,965
Wire cloth, etc.....		4,433		1,308
All other manufactures of, n.o.p.....		188,270		251,924
Copper, precipitate of, crude.....	2,017	328	187	35
Copper sulphate.....	1,143,039	53,802	1,854,850	99,282
Total value.....		4,256,901		3,957,770

Imports of Copper 1907 to 1915 inclusive.

Year.	Pigs, ingots or in blocks.		Old and scrap.		Manufactures of copper.				Crude precipitate.		Copper sulphate.		Total value.
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Bars, rods, sheets, tube and wire.	Other manufactures.	Pounds.	Value.	Pounds.	Value.	
1907.....	3,456,900	\$699,388	196,300	\$ 37,787	13,499,130	\$ 3,138,283		\$108,057	7,397	\$1,340	2,299,674	\$142,948	\$4,127,803
1908.....	2,360,900	353,301	127,700	12,821	12,150,850	1,765,415		88,715	4,209	557	2,768,123	131,057	2,351,866
1909.....	4,200,100	554,273	132,600	14,447	16,208,978	2,340,464		126,769	1,990	257	1,634,751	66,459	3,102,669
1910.....	4,640,500	609,111	273,700	31,070	25,322,906	3,579,270		150,322	4,847	595	1,925,557	77,782	4,448,150
1911.....	5,650,400	705,598	265,300	28,748	29,244,210	3,898,416		215,289	2,608	299	2,101,899	88,419	4,936,769
1912.....	5,121,800	806,705	400,500	56,748	35,198,208	5,776,003		305,680	5,703	570	2,105,419	101,650	7,047,356
1913.....	5,314,200	845,095	596,700	87,790	35,101,061	6,002,937		370,313	4,743	515	2,037,714	107,960	7,414,610
1914.....	3,733,300	507,499	127,800	15,717	22,419,715	3,460,106		219,449	2,017	328	1,143,039	53,802	4,256,901
1915.....	4,771,200	777,533	68,500	8,281	15,405,520	2,807,969		264,670	187	35	1,854,850	99,282	3,957,770

Copper: Imports of Pigs, Old, Scrap, etc.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880.....	31,900	\$ 2,130	1898.....	1,050,000	\$ 80,000
1881.....	9,800	1,157	1899.....	1,655,000	246,740
1882.....	20,200	1,984	1900.....	1,144,000	180,990
1883.....	124,500	20,273	1901.....	951,500	152,274
1884.....	40,200	3,180	1902.....	1,767,200	325,832
1885.....	28,600	2,016	1903.....	2,038,400	252,594
1886.....	82,000	6,969	1904.....	2,115,300	270,315
1887.....	40,100	2,507	1905.....	1,944,400	266,548
1888.....	32,300	2,322	1906.....	2,627,700	441,854
1889.....	32,300	3,288	Calendar Year.		
1890.....	112,200	11,521	1907.....	3,653,200	737,175
1891.....	107,800	10,452	1908.....	2,488,600	366,122
1892.....	343,600	14,894	1909.....	4,332,700	568,720
1893.....	168,300	16,331	1910.....	4,914,200	640,181
1894.....	101,200	7,397	1911.....	5,915,700	734,346
1895.....	72,062	6,770	1912.....	5,522,300	863,453
1896.....	86,905	9,226	1913.....	5,910,900	932,885
1897.....	49,000	5,449	1914.....	3,861,100	523,216
			1915.....	4,839,700	785,814

Imports of Manufactures of Copper.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880.....	\$123,061	1892.....	\$422,870	1904.....	\$1,191,610
1881.....	159,163	1893.....	458,715	1905.....	1,775,881
1882.....	220,235	1894.....	175,404	1906.....	2,660,303
1883.....	247,141	1895.....	251,615	Calendar Year	
1884.....	134,534	1896.....	285,220	1907.....	3,246,340
1885.....	181,469	1897.....	264,587	1908.....	1,854,130
1886.....	219,420	1898.....	786,529	1909.....	2,467,233
1887.....	325,365	1899.....	551,586	1910.....	3,729,592
1888.....	303,459	1900.....	1,090,280	1911.....	4,113,705
1889.....	402,216	1901.....	951,045	1912.....	6,081,683
1890.....	472,668	1902.....	1,281,522	1913.....	6,373,250
1891.....	563,522	1903.....	1,291,635	1914.....	3,679,555
				1915.....	3,072,639

There is also an importation of copper in the form of brass. The imports of brass in 1915 included 3,810,948 pounds of metal in crude and manufactured form (see Chapter on Zinc) containing possibly 2,667,663 pounds of copper, valued at \$714,410, and also manufactures of brass, quantity not recorded, valued at \$2,463,532.

Consumption of Copper.—In view of the large import of manufactured copper and brass for which no quantity is recorded, it is difficult to estimate closely the consumption of copper. It is apparent, however, that the consumption in 1915 exceeded 23,000,000 pounds, while it is probable that the metal contained in other manufactures of copper and brass was not more than 5,000,000 pounds. The consumption in 1913 exceeded 44,000,000 pounds.

Quebec.

The mines in the Eastern Townships were still more active in 1915 than in the past years, and the slight decrease in production is attributed to the destruction by fire of the power plant and concentrator of the Eustis Mining Company.

The production amounted to 4,197,482 pounds, valued at \$725,115, representing the estimated recovery from 139,865 tons of ore and concentrates.

Statistics of the copper production of Quebec province since 1886 are shown in the following table:—

Quebec: Production of Copper.

Year.	Pounds.	Value.	Year.	Pounds.	Value.	Year.	Pounds.	Value.
1886.....	3,340,000	\$ 367,400	1896....	2,407,200	\$ 261,903	1906....	1,981,169	\$ 381,930
1887.....	2,937,900	330,514	1897....	2,474,970	279,424	1907....	1,517,990	303,659
1888.....	5,562,864	927,107	1898....	2,100,235	252,658	1908....	1,282,024	169,330
1889.....	5,315,000	730,813	1899....	1,632,560	287,494	1909....	1,088,212	141,272
1890.....	4,710,606	741,920	1900....	2,220,000	359,418	1910....	877,347	111,757
1891.....	5,401,704	695,469	1901....	1,527,442	246,178	1911....	2,436,190	301,503
1892.....	4,883,480	564,042	1902....	1,640,000	190,666	1912....	3,282,210	536,346
1893.....	4,468,352	480,348	1903....	1,152,000	152,467	1913....	3,455,887	527,679
1894.....	2,176,430	208,067	1904....	760,000	97,455	1914....	4,201,497	571,488
1895.....	2,242,462	241,288	1905....	1,621,243	252,752	1915....	4,197,482	725,115

Ontario.

The copper production from Ontario comes mainly from the nickel-copper ores of Sudbury district.

The chief companies are: The Canadian Copper Co., Limited, shipping from the Creighton, Crean Hill, the No. 2, the No. 3, or Frood, and the Vermillion mines; and the Mond Nickel Co., Ltd., operating the Garson, Victoria, Frood Extension, Levack, Worthington and Kirkwood mines.

The Alexo Mining Co., operating near Porquis Junction on the T. & N.O. Railway, shipped a considerable tonnage of nickel-copper to the Mond Nickel Company's smelter at Coniston. The Sudbury Leasing and Development Company, of Sudbury, also was an important shipper to Coniston.

The British America Nickel Corporation did not operate any of its properties during 1915.

A few small shipments of copper ore were made from the following: Price-Brewer mine, near Latchford—the Bruce mine, near Bruce Mines, Algoma—and the property of the Sable River Copper Co., near Massey. There is also a small recovery of copper from Cobalt District silver ores sent to United States smelters.

The copper production from Ontario in 1915 amounted to 39,361,464 pounds, valued at \$6,799,693, *i.e.*, 39 per cent of the production of Canada.

The total tonnage of nickel-copper ores smelted in 1915 was 1,272,283 tons. There were produced during the year 67,703 tons of bessemer matte, containing 19,608 tons of copper and 34,039 tons of nickel, the shipping value of the matte being reported as \$10,352,344. Details of the production of these ores are given more completely and in tabular form in the article on "Nickel."

The Ontario Government offers a bounty on copper over 95 per cent pure metal, and on copper-sulphate produced from ore mined and refined in the Province. The text of the Act was quoted in the Annual Report on Mineral Production of Canada, 1914, p. 60.

Statistics of the copper production of Ontario since 1886 are given in the table following:—

Ontario: Production of Copper.

Year.	Pounds.	Value.	Year.	Pounds.	Value.	Year.	Pounds.	Value.
1886.....	165,000	\$ 18,150	1896....	3,167,256	\$ 344,598	1906....	10,638,231	\$2,050,838
1887.....	322,524	36,284	1897....	5,500,652	621,023	1907....	14,104,337	2,821,432
1888.....	Nil.	Nil.	1898....	8,375,223	1,007,539	1908....	15,005,171	1,981,883
1889.....	1,466,752	201,678	1899....	5,723,324	1,007,877	1909....	15,746,699	2,044,237
1890.....	1,303,065	205,233	1900....	6,740,058	1,091,215	1910....	19,259,016	2,453,213
1891.....	4,127,697	531,234	1901....	8,695,831	1,401,507	1911....	17,932,263	2,219,297
1892.....	2,203,795	254,538	1902....	7,408,202	861,278	1912....	22,250,601	3,635,971
1893.....	3,641,504	391,461	1903....	7,172,533	949,285	1913....	25,885,929	3,952,522
1894.....	5,207,679	497,854	1904....	4,913,594	630,070	1914....	28,948,211	3,937,536
1895.....	4,576,337	492,414	1905....	8,779,259	1,368,686	1915....	39,361,464	6,799,693

British Columbia.

According to returns received from the smelters, the total quantity of copper contained in matte, blister, and copper-sulphate produced in British Columbia during 1915, and including an estimate of smelter recovery for copper ores exported, was 56,692,988 pounds, after deducting the amount of copper produced from foreign ores. The production of 1914 on a similar basis was 41,219,202 pounds, and in 1913, 45,791,579 pounds.

Returns of smelter production in this Province were not collected by this Department previous to 1908, and a complete record of statistics of production on this basis is not available.

The following table shows that the production in 1915 exceeded by over six million pounds, that of 1912, which had been a maximum and that the value of the production in 1915 was more than double that of 1908, when this Department first collected returns of smelter production.

British Columbia: Production of Copper.

Year.	Pounds.	Value.	Year.	Pounds.	Value.
1908.....	37,041,115	\$4,892,390	1912.....	50,526,656	\$8,256,561
1909.....	35,658,952	4,629,245	1913.....	45,791,579	6,991,916
1910.....	35,270,006	4,492,693	1914.....	41,219,202	5,606,636
1911.....	35,279,558	4,366,198	1915.....	56,692,988	9,793,714

Since 1909 the method of compilation of statistics of copper production by the Provincial Bureau of Mines of British Columbia, which is based upon ore shipments from mines, provides for a deduction of five pounds of copper per ton of ore shipped on account of smelter losses, a method which gives a result closely approximating that obtained by this Branch. Previous to 1909 no allowance for smelter losses was made.

The production of copper in this Province, according to the Provincial record, reached a total of 56,918,405 pounds in 1915, as compared with 45,009,699 pounds in 1914. Statistics of the annual production since 1894, as ascertained by the Provincial Department of Mines, and the production by districts since 1910 are shown in the tables following:—

British Columbia: Copper Content of Ores Shipped.†

Calendar Year.	COPPER CON- TAINED IN ORES SHIPPED.	INCREASE OR DECREASE.		Value.
	Pounds.	Pounds.	%	
1894.....	324,680	.....	.....	\$ 31,039
1895.....	952,840	628,160	193.00	102,526
1896.....	3,818,556	2,865,716	301.00	415,459
1897.....	5,325,180	1,506,624	39.00	601,213
1898.....	7,271,678	1,946,498	36.00	874,783
1899.....	7,722,591	450,913	6.00	1,359,948
1900.....	9,977,080	2,254,489	29.00	1,615,289
1901.....	27,603,746	17,626,666	177.00	4,448,896
1902.....	29,636,057	2,032,311	7.00	3,445,488
1903.....	34,359,921	4,723,864	16.00	4,547,735
1904.....	35,710,128	1,350,207	3.7	4,579,110
1905.....	37,692,251	1,982,123	5.6	5,876,222
1906.....	42,990,488	5,298,237	14.1	8,287,706
1907.....	40,832,720	(d) 2,157,768	(d) 5.02	8,168,177
1908.....	47,274,614	6,441,894	15.8	6,244,031
1909.....	45,597,245	(d) 1,677,369	(d) 3.6	5,918,522
1910.....	38,243,934	.....	.....	4,871,512
1911.....	36,927,656	(d) 1,316,278	(d) 3.4	4,571,644
1912.....	51,546,537	14,618,881	39.6	8,408,513
1913.....	46,460,305	(d) 4,996,232	(d) 9.7	7,094,489
1914.....	45,009,699	(d) 1,450,606	(d) 3.1	6,121,319
1915.....	56,918,405	11,908,706	26.4	9,835,500

† As published by British Columbia Bureau of Mines. ‡ Allowing 5 pounds copper per ton of ore for smelter losses.

British Columbia: Production of Copper by Districts.‡

(In pounds).

—	1910.	1911.	1912.	1913.	1914.	1915.
Cariboo—Omineca.....	.....	.....	.....	1,838	6,000	2,831,279
Cassiar—Skeena, etc.....	.....	19,151	88,403	1,336	11,123,376	21,915,481
West Kootenay—	.....	.....	.....	.....	.....	.....
Nelson.....	231,936	.....	26,257	815,126	586,764	30,240
Trail creek.....	3,577,745	3,429,702	2,539,900	2,538,661	3,779,830	4,651,681
Yale.....	.....	.....	.....	.....	.....	.....
Boundary.....	31,354,985	22,327,359	33,372,199	28,621,973	16,428,959	17,402,662
Ashcroft & Kamloops.....	1,178	152,723	.....	29,505	14,525	295,164
Similkameen.....	.....	.....	.....	8,073	.....	21,701
Coast districts.....	3,078,090	10,998,721	15,429,778	14,443,793	13,070,245	9,770,197
Totals.....	38,243,934	36,927,656	51,456,537	46,460,305	45,009,699	56,918,405

‡ After deducting five pounds of copper per ton of ore for slag losses.

According to the preceding table, the ores from the Cassiar produced in 1915, 38.5 per cent of the total; those from the Boundary 31.1 per cent; the Trail and Nelson divisions came in for 8.2 per cent, and the Coast district for 17.2 per cent; and the Cariboo for 5 per cent.

"The average assays of the copper ores of the various camps, based upon the copper recovered were as follows:—

"Boundary 0.708 per cent; Coast, Omineca and Cassiar 1.94 per cent; and Rossland 0.686 per cent.

"Copper mining is now the most important form of mining in the Province, and in 1915 it practically equalled in value the entire total value of the other lode minerals produced, and exceeded, considerably the value of coal and coke production. It forms 47.4 per cent of the total value of metalliferous mines, and 33.4 per cent of the total mineral production."*

In the Boundary the production was mainly from the mines of two of the large smelting companies: The Granby Consolidated Mining, Smelting & Power Co., Ltd., and the British Columbia Copper Co., Ltd.

These two companies operate their own smelters and convert their matte to blister copper. The low grade ores of this district are self-fluxing and very uniform in character, averaging a little over one per cent in copper, and from \$1 to \$2 in gold and silver.

The British Columbia Copper Company have been steadily developing their properties at Princess camp in the Similkameen, employing a large number of men. Some properties were producing during 1915 and we may look forward to the eventual establishment in that part of the country of another important copper producing centre.

Much development and some shipments are reported from the Ashcroft and Nicola divisions.

In the interior the main shippers were, at Rossland, the Centre Star and Le Roi groups, owned by the Consolidated Mining and Smelting Co., and the Le Roi II (Josie) mine. Besides these, shipments were made from the Nelson district by the Queen Victoria mine and a few other operators.

In the Kamloops division the Iron Mask mine is the only important shipper.

Much development was done in the neighbourhood of New Hazelton in the Omineca mining division, and the Rocher Déboulé mine, after a couple of years of extensive development, has become an important producer.

In the Boundary district, the production was about the same as that of 1914, which had been much below the production of 1912 and 1913—but this decrease in production for the last two years is more than offset by the large increase in production of the Coast district, which now ranks

*The Report of the Minister of Mines, British Columbia, 1915.

as the principal producer of copper ores in British Columbia with heavy shipments from the Hidden Creek mine on Observatory Inlet; the Britannia mines on Howe Sound and the Marble Bay mines on Texada island.

Yukon.

The main shipments from this Territory have been from the Pueblo mine near Whitehorse. This property was idle during 1915, but the Company was reorganized as the Yukon Mining Company, and it will likely be again an important producer. The two principal shippers were: the Grafton and the Anaconda mines—both in the Whitehorse division.

GOLD.

The production of gold in Canada in 1915 reached a total of 918,056 fine ounces, valued at \$18,977,901, as compared with 773,178 fine ounces, valued at \$15,983,007 in 1914, and was made up as follows: (a) gold derived from alluvial workings \$5,524,476, or 29 per cent of the total; (b) gold obtained from the crushing of free milling quartz ores, *i.e.*, stamp mill bullion, \$8,909,170 or 47 per cent; and (c) gold obtained from ores and concentrates sent to the copper and lead smelters, \$4,544,255 or 24 per cent of the total production.

The production in 1914 included: (a) gold derived from alluvial workings \$5,687,501 or 35·6 per cent of the total; (b) gold obtained from the crushing of free milling quartz ores, *i.e.*, stamp mill bullion \$6,051,968, or 37·9 per cent; and (c) gold obtained from ores and concentrates sent to the copper and lead smelters \$4,243,538, or 26·5 per cent of the total production.

Statistics of the annual gold production of Canada are shown in the following table:—

Annual Production of Gold in Canada, 1858-1915.

Year.	Fine ounces†	Value.	Year.	Fine ounces†	Value.	Year.	Fine ounces†	Value.
1858.....	34,104	\$ 705,000	1878....	74,420	\$1,538,394	1898....	666,386	\$13,775,420
1859.....	78,129	1,615,072	1879....	76,547	1,582,358	1899....	1,028,529	21,261,584
1860.....	107,806	2,228,543	1880....	63,121	1,304,824	1900....	1,350,057	27,908,153
1861.....	128,973	2,666,118	1881....	63,524	1,313,153	1901....	1,167,216	24,128,503
1862.....	135,391	2,798,774	1882....	60,288	1,246,268	1902....	1,032,161	21,336,667
1863.....	202,498	4,186,011	1883....	53,853	1,113,246	1903....	911,559	18,843,590
1864.....	199,605	4,126,199	1884....	51,202	1,058,439	1904....	796,374	16,462,517
1865.....	192,898	3,987,562	1885....	55,575	1,148,829	1905....	684,951	14,159,195
1866.....	152,555	3,153,597	1886....	70,782	1,463,196	1906....	556,415	11,502,120
1867.....	145,775	3,013,431	1887....	57,460	1,187,804	1907....	405,517	8,382,780
1868.....	134,169	2,773,527	1888....	53,145	1,098,610	1908....	476,112	9,842,105
1869.....	102,720	2,123,405	1889....	62,653	1,295,159	1909....	453,865	9,382,230
1870.....	83,415	1,724,348	1890....	55,620	1,149,776	1910....	493,707	10,205,835
1871.....	105,187	2,174,412	1891....	45,018	930,614	1911....	473,159	9,781,077
1872.....	90,283	1,866,321	1892....	43,905	907,601	1912....	611,885	12,648,794
1873.....	74,346	1,536,871	1893....	47,243	976,603	1913....	802,973	16,598,923
1874.....	97,856	2,022,862	1894....	54,600	1,128,688	1914....	773,178	15,983,007
1875.....	130,300	2,693,533	1895....	100,798	2,083,674	1915....	918,056	18,977,901
1876.....	97,729	2,020,233	1896....	133,262	2,754,774	.....	.....	.....
1877.....	94,304	1,949,444	1897....	291,557	6,027,016	.....	.....	.....

† Calculated from the value: one dollar = 0·048375 oz.

Gold was first discovered in various provinces about 1858, and the production gradually increased to over four million dollars in 1863, but fell again to \$907,601 in 1892. The discovery of gold in the Yukon and other discoveries in 1896 gave the mining industry a new impetus, resulting in a rapid increase in the gold production, which, in 1900, reached the high mark of nearly twenty-eight million dollars. From this maximum it decreased again to a little over eight million dollars in 1907. With the

discovery and development of the Porcupine mines in Ontario, gold production has rapidly increased again.

Exports and Imports.—The exports of gold in dust, nuggets etc., during 1915 were valued at \$16,528,143.

The imports during the calendar year 1915 were: gold bullion, valued at \$1,028,405; gold coins \$19,910,229, and manufactures of gold and silver, valued at \$464,294.

The Dominion Assay Office in Vancouver, operated in connexion with this Department, receives, assays, and purchases crude bullion, amalgam, nuggets, and dust, the resultant bullion being re-sold. The total quantity of bullion thus received during the twelve months ending December 31, 1915, was 183,924·49 ounces, which, after melting was reduced to 179,751·68 ounces and valued at \$2,736,302·31, after deducting office charges.

The receipts were mostly from British Columbia and the Yukon, with also a few small deposits from Alaska and Alberta.

Refined Metal.—A refinery is in operation at the Royal Mint at Ottawa and shipments of gold have been received from various provinces.

There is but one other refinery in Canada producing fine gold; that of the Consolidated Mining and Smelting Co. of Canada, Limited, at Trail, B.C., where the gold is mainly recovered from the high grade silver-lead ores and the "dry" ores shipped to the smelter. Its annual output is given below in the table following:—

Production of Refined Gold at Trail, B.C.

Year.	Ounces.	Year.	Ounces.	Year.	Ounces.
1904.....	4,336	1908.....	15,346	1912.....	12,118
1905.....	8,602	1909.....	18,241	1913.....	11,977
1906.....	9,993	1910.....	13,298	1914.....	11,088
1907.....	10,395	1911.....	15,270	1915.....	17,813

The production of gold by provinces is given in the following table in which it will be seen that Ontario, since the discovery of the Porcupine camp, has gradually increased its production, and to such an extent that in 1915 it produced 44·3 per cent of the total, as against 14·1 per cent in 1912.

Production of Gold by Provinces, 1913, 1914, and 1915.

	1913.		1914.		1915.	
	Fine ounces.†	Value.	Fine ounces.†	Value.	Fine ounces.†	Value.
Nova Scotia.....	2,174	\$ 44,935	2,904	\$ 60,031	6,636	\$ 137,180
Quebec.....	701	14,491	1,292	26,708	1,099	22,720
Ontario.....	219,801	4,543,690	268,264	5,545,509	406,577	8,404,693
Alberta.....			48	992	195	4,026
British Columbia.....	(a) 297,459	6,149,027	(a) 252,730	5,224,393	(a) 273,376	5,651,184
Yukon.....	282,838	5,846,780	247,940	5,125,374	230,173	4,758,098
Totals.....	802,973	16,598,923	773,178	15,983,007	918,056	18,977,901

† Calculated from the value: one dollar = 0.048375 oz.

	1913.	1914.	1915.
(a) As follows: Gold from placer mining.....	\$ 510,000	\$ 565,000	\$ 770,000
Gold from vein mining.....	5,639,027	4,659,393	4,881,184
	6,149,027	5,224,393	5,651,184

The exact value of fine gold is $\frac{383}{1000}$ dollars per ounce equivalent to \$20.671834. (United States Standard.)
In most cases, statistics of gold production are stated as crude bullion with value thereof. The fine ounces given in the tables in this report are calculated from the values by multiplying these by $\frac{383}{1000}$ or 0.048375.

Nova Scotia.

The gold production of this Province, which is derived almost entirely from quartz ores, is reported by the Provincial Department of Mines in 1915, as 6,636 fine ounces, valued at \$137,180, compared with 2,904, fine ounces, valued at \$60,031 for the year 1914, *i.e.*, an increase of 128 per cent.

The production of Nova Scotia which was 6,863 fine ounces in 1862, reached a maximum of 30,348 fine ounces in 1902; then decreased gradually, reaching in 1913 a minimum of 2,174 fine ounces. It is interesting to note that the production in 1915 is nearly identical to that of 1862, the first year returns were reported.

Statistics of the annual production since 1862, with also the production by districts during the 12 months ending September 30, 1915, and the annual production by district since 1862, as published by the Provincial Mines Department, are given in the following table:—

Nova Scotia: Annual Production of Gold.

Year.	Tons. treated.	Fine ounces.	Value.	Yield of gold per ton.	Year.	Tons treated.	Fine ounces.	Value.	Yield of gold per ton.
1862.....	6,473	6,863	\$141,871	\$21.91	1889..	39,160	24,673	\$ 510,029	\$13.02
1863.....	17,000	13,180	272,448	16.02	1890..	42,749	22,978	474,990	11.11
1864.....	21,431	18,883	390,349	18.21	1891..	36,351	21,841	451,503	12.42
1865.....	24,421	24,011	496,357	20.32	1892..	32,552	18,865	389,965	11.98
1866.....	32,157	23,776	491,491	15.28	1893..	42,354	18,436	381,095	8.99
1867.....	31,384	25,763	532,563	16.96	1894..	55,357	18,834	389,338	7.04
1868.....	32,259	19,377	400,555	12.41	1895..	60,600	21,919	453,119	7.47
1869.....	35,144	16,855	348,427	19.91	1896..	69,169	23,876	493,568	7.13
1870.....	30,824	18,740	387,392	12.56	1897..	73,192	27,195	562,165	7.68
1871.....	30,787	18,139	374,972	12.17	1898..	82,747	26,054	538,590	6.50
1872.....	17,089	12,352	255,349	14.94	1899..	112,226	29,876	617,604	5.50
1873.....	17,708	11,180	231,122	13.05	1900..	87,390	28,955	598,553	6.85
1874.....	13,844	8,623	178,244	12.87	1901..	91,948	26,459	546,963	5.32
1875.....	14,810	10,576	218,629	14.76	1902..	93,042	30,348	627,357	6.68
1876.....	15,490	11,300	233,585	15.08	1903..	103,856	25,533	527,806	5.08
1877.....	17,369	15,925	329,205	18.95	1904..	45,436	10,362	214,209	4.71
1878.....	17,989	11,864	245,253	13.63	1905..	57,774	13,707	283,353	4.90
1879.....	15,936	12,980	268,328	16.83	1906..	66,059	12,223	252,676	3.82
1880.....	13,997	12,472	257,823	18.42	1907..	58,550	13,675	282,686	4.82
1881.....	16,556	10,147	209,755	12.66	1908..	61,536	11,842	244,799	3.97
1882.....	21,081	13,307	275,090	13.04	1909..	56,790	10,193	210,711	3.71
1883.....	25,954	14,571	301,207	11.60	1910..	43,006	7,928	163,891	3.81
1884.....	25,186	15,168	313,554	12.44	1911..	18,328	7,781	160,854	8.78
1885.....	28,890	20,945	432,971	14.98	1912..	14,360	4,385	90,638	6.51
1886.....	29,010	22,038	455,564	15.70	1913..	7,324	2,174	44,935	6.13
1887.....	32,280	20,009	413,631	12.81	1914..	13,156	2,904	60,031	4.56
1888.....	36,178	21,137	436,939	12.08	1915..	25,204	6,636	137,180	5.44
					Total,	2,163,323	899,833	18,601,282	8.60

Nova Scotia: District Details of Gold Production.†
(Year ending September 30, 1915).

District.	Tons crushed.	TOTAL YIELD OF GOLD.			AVERAGE YIELD OF GOLD PER TON.		
		ounces.	dwt.	grs.	ounces.	dwt.	grs.
Caribou.....	322	293	18	.....	.....	18	6
Caribou (Moose River).....	276	64	18	.....	.....	4	7
Gold River.....	40	66	9	.....	1	13	5
Harrigan Cove.....	17	8	11	.....	.....	10	1
Kempville.....	3	2	15	.....	.....	18	3
Lake Catcha.....	44	101	10	7	2	6	3
Malaga Barrens.....	102	116	16	.....	1	2	22
Miller's Lake.....	18	8	19	.....	.....	9	22
Montague.....	61	135	10	.....	2	4	10
Oldham.....	321	562	14	.....	1	15	1
Sherbrooke.....	19,093	2,125	9	16	.....	2	15
Shier's Point.....	251	26	4	12	.....	2	2
Stormont.....	1,594	1,479	4	19	.....	18	13
Tangier.....	1,969	472	9	19	.....	4	19
Waverley.....	36	5	18	.....	.....	3	7
Wagamatkook.....	274	41	14	19	.....	3	1
Mortared.....	.....	4	15	.....	.....	.....	.....
		24,421	5,517	16	20	4	12
West Gore (gold in concentrates).....	783	1,698	5	.....	2	3	9
Totals.....	25,204	7,216	1	20	.....	5	17

†From the Report of the Provincial Mines Department.

Nova Scotia: Production of Gold from 1862 to 1915.†

District.	Tons crushed.	TOTAL YIELD OF GOLD.			AVERAGE YIELD OF GOLD PER TON.			Valued at \$19 per ounce.
		ounces.	dwt.	grs.	ounces.	dwt.	grs.	
Caribou and Moose River <i>a</i> ...	222,831	61,678	7	14	.....	5	13	\$1,171,889
Montagu.....	29,801	42,368	2	8	1	8	10	804,994
Oldham.....	59,669	68,250	12	22	1	2	21	1,296,762
Renfrew.....	61,795	48,699	7	19	.....	15	18	925,289
Sherbrooke.....	326,112	156,111	4	20	.....	9	14	2,966,113
Stormont.....	529,108	122,745	3	8	.....	4	16	2,332,158
Tangier.....	69,397	29,437	18	7	.....	8	12	559,320
Uniacke <i>b</i>	63,351	43,983	1	17	.....	13	21	835,679
Waverley.....	155,556	69,986	8	16	.....	9	0	1,329,742
Brookfield <i>c</i>	93,527	38,709	2	2	.....	8	7	735,473
Salmon River <i>d</i>	118,819	41,852	5	20	.....	7	1	795,194
Whiteburn <i>e</i>	6,907	9,800	.....	2	1	8	9	186,200
Lake Catcha.....	31,972	28,311	5	0	.....	17	17	537,914
Rawdon <i>c</i>	12,189	9,606	5	10	.....	15	18	182,519
Wine Harbour.....	77,396	34,992	15	11	.....	9	1	664,863
Fifteenmile Stream <i>d</i>	36,878	17,363	0	5	.....	9	10	329,897
Malaga Barrens.....	23,028	20,422	8	6	.....	17	18	388,026
West Gore (from Stibnite ore) <i>f</i>	4,023	6,211	0	10	1	10	21	118,009
Other Districts.....	146,438	75,835	10	12	.....	10	9	1,440,875
Totals.....	2,068,798	926,364	0	17	.....	8	23	17,600,916

a From 1869, *b* from 1868, *c* from 1887, *d* from 1883, *e* from 1882, *f* from 1905.

† From the Report of the Provincial Mines Department.

Quebec.

The gold production in Quebec during 1915 was 1,099 fine ounces, valued at \$22,720, as against 1,292 fine ounces, valued at \$26,708 in 1914, a decrease of 15 per cent. This production is derived from the pyritic mines of the Eastern Townships, which are worked chiefly for the sulphur and copper contents of the ore.

No alluvial production has been reported for a number of years. The following table gives the production for Quebec from 1877 to 1915:—

Quebec: Annual Production of Gold.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1877.....	583	\$ 12,057	1890....	65	\$ 1,350	1903....	180	\$ 3,712
1878.....	868	17,937	1891....	87	1,800	1904....	140	2,900
1879.....	1,160	23,972	1892....	628	12,987	1905....	191	3,940
1880.....	1,605	33,174	1893....	759	15,696	1906....	165	3,412
1881.....	2,741	56,661	1894....	1,412	29,196	1907.....	.....	.....
1882.....	827	17,093	1895....	62	1,281	1908.....	.....	.....
1883.....	860	17,787	1896....	145	3,000	1909....	193	3,990
1884.....	422	8,720	1897....	44	900	1910....	124	2,565
1885.....	103	2,120	1898....	295	6,089	1911....	613	12,672
1886.....	193	3,981	1899....	238	4,916	1912....	642	13,270
1887.....	78	1,604	1900....	.....	.....	1913....	701	14,491
1888.....	181	3,740	1901....	145	3,000	1914....	1,292	26,708
1889.....	58	1,207	1902....	391	8,073	1915....	1,099	22,720
						Total...	19,290	398,721

‡ Calculated from the value: one dollar = 0.048375 ounces.

Ontario.

The gold production in Ontario, which in 1913 had exceeded the total of all the other years since 1886, nearly doubled that figure in 1915, amounting to 406,577 fine ounces, valued at \$8,404,693, as against 268,264 fine ounces, valued at \$5,545,509 in 1914.

The Porcupine district has since its development, been the main producer. Other producing districts were: Kirkland Lake and Munro township, in Timiskaming district; and Long Lake, near Sudbury, Algoma district.

Statistics of the production of gold in Ontario, since 1887 are shown in the following table:—

Ontario: Annual Production of Gold.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1887.....	327	\$ 6,760	1897....	9,157	\$ 189,294	1907....	3,212	\$ 66,399
1888.....			1898....	12,863	265,889	1908....	3,212	66,389
1889.....			1899....	20,394	421,591	1909....	1,569	32,425
1890.....			1900....	14,391	297,495	1910....	3,089	63,849
1891.....	97	2,000	1901....	11,844	244,837	1911....	2,062	42,625
1892.....	344	7,118	1902....	11,118	229,828	1912....	86,523	1,788,596
1893.....	708	14,637	1903....	9,096	188,036	1913....	219,801	4,543,690
1894.....	1,917	39,624	1904....	1,935	40,000	1914....	268,264	5,545,509
1895.....	3,015	62,320	1905....	4,402	91,000	1915....	406,577	8,404,693
1896.....	5,563	115,000	1906....	3,202	66,193	Total...	1,104,682	22,835,797

‡Calculated from the value: one dollar = 0.048375 ounces.

It may be noted from the table "Production of Gold by Provinces," that Ontario from third rank, has become by far the largest producer of gold in Canada.

The remarkable increase of these last three years was brought about by the successful development of the Porcupine district and recently by the extension of milling facilities in that camp.

The following table shows the rapid increase in production of the Porcupine camp, in the last few years:—

Porcupine Gold Production 1910-1915.*

Year.	Value.	Year.	Value.
1910.....	\$ 35,539	1913.....	\$ 4,284,928
1911.....	17,187	1914.....	5,203,229
1912.....	1,730,628	1915.....	7,580,766
		Total.....	18,852,277

*From the Report of Timiskaming and Northern Ontario Railway Commission.

The principal producers during 1915 were:—

OPERATOR.	MINE.	DISTRICT.
Canadian Exploration Co.....	Long Lake.....	Algoma.
Acme Gold Mines, Ltd.....	Acme.....	Timiskaming:—
Dome Mines Co., Ltd.....	Dome.....	Porcupine.
Dome Lake Mines, Ltd.....	Dome Lake.....	"
Hollinger Gold Mines, Ltd.....	Hollinger.....	"
McIntyre Porcupine Mines, Ltd.....	McIntyre.....	"
Mines Leasing and Development Co.....	Rea.....	"
Porcupine Crown Mines, Ltd.....	Porcupine Crown.....	"
Vipond Mines Co. Ltd.....	Porcupine Vipond.....	"
Wm. C. Offer et al.....	Porphyry Hill.....	"
Schumacher Gold Mines, Ltd.....	Schumacher.....	"
Teck-Hughes Gold Mines, Ltd.....	Teck-Hughes.....	Kirkland L.
Tough Oakes Gold Mines, Ltd.....	Tough Oakes.....	"
Croesus Gold Mines, Ltd.....	Dobie-Leyson.....	Munro.

Other districts besides Timiskaming and Sudbury, though not as yet arrived at the producing stage, have shown much activity during 1915 and may soon become important mining centres.

The principal of these districts is the Kowkash district which is reported on by Mr. P. E. Hopkins in Bull. No. 27 of the Ontario Bureau of Mines, in the following terms:—

"The Kowkash gold area is situated in the centre part of the district of Thunder Bay, Ontario, northeast of Lake Nipigon and is traversed by the National Transcontinental railway—Kowkash station is 297 miles west of Cochrane."

"A spectacular gold find was made by E. W. King Dodds, on August 21, 1915, nine miles northwest of Kowkash, near Howard Falls, on the river Kawachkagama. E. W. King Dodds made his discovery while walking over the rocky hill below Howard Falls, which had been burned clean of moss and trees on the previous day. The news of the rich find caused a rush of about 400 prospectors to the neighborhood and 75 to 100 claims were staked within three weeks."

Other gold discoveries were subsequently made in the surrounding district, the most important being at Tashota, 22 miles west of Kowkash, where gold and telluride were discovered.

In the Kenora district much interest was caused by the report of rich gold findings on the Rognon property, near Wabigoon lake.

In the Boston Creek district, Timiskaming, the promising development work on the Kensie property attracted many prospectors to the area and resulted in new discoveries in this district. The Provincial Bureau of Mines had a report made on this district, and published in 1916.*

Much prospecting and development have been done in the adjoining district of Goodfish lake.

The most spectacular find probably ever made was that of August 1915, in Munro township, Timiskaming, on the Dobie-Leyson property,

*Bulletin No. 29 of the Ontario Bureau of Mines, on Boston Creek and Goodfish Lake Gold Areas.

now called Croesus Mine. Specimens from this property have been reported to run from 2,000 to 3,000 ounces in gold.

The following notes are taken from the respective company's reports:—

The Dome Mines Co. Ltd.

"Record of production for twelve months ending March 31, 1916:—

Tons of ore milled.....	347,640
Bullion recovered by amalgamation.....	\$1,130,748.95
" " cyanidation.....	\$648,209.96
Per cent of value recovered by amalgamation.....	59.04
" " cyanidation.....	33.84
Total value recovered.....	\$1,778,958.91
Average yield per ton.....	5.117
Per cent of value recovered.....	92.88
Per cent of possible running time.....	95.00

"The mill operated successfully 95.0 per cent of the possible time during the period, crushing and treating at a cost of \$0.910 per ton, being a net reduction of \$0.089 per ton, as compared with that of the previous year.

"The extraction, 92.88 per cent, compared with that achieved last year (90.6 per cent) is noteworthy, and the lowering of the working costs \$0.089 most satisfactory, as in this department also the cost of supplies has advanced greatly.

"The additions and improvements in the mill, which will ultimately give a capacity of 45,000 tons per month, are expected to enable us to still further improve the extraction, and to considerably reduce the working costs. At the start of the fiscal year the monthly crushing rate was 23,630 tons, and at the close 34,300 tons."

The Dome is essentially a low grade proposition.

Dome Lake Mining and Milling Co. Ltd.

Year ending December 31, 1915:—

Tons of ore milled.....	11,728
Gross value of ore treated.....	\$106,941.40
Average value per ton treated.....	9.12
Loss per ton treated (tailings).....	1.83
Value recovered by amalgamation.....	\$70,676.48 or 66.10%
" " concentration.....	\$14,810.56 or 13.83%
Total value recovered.....	\$85,487.04 or 79.93%
Amalgam produced.....	13,668.50 ozs.
Bullion produced.....	3,966.98 "
Value of bullion per ounce.....	\$17.82
Concentrates produced.....	221.64 tons
Average value per ton.....	\$65.92

"An average of 1,081.3 tons per month was treated in the mill. With alterations now being made it will handle from 1,500 to 1,800 tons per month."

Hollinger Gold Mines, Ltd.

Year ending December 31, 1915:—

	Hollinger.	Acme.	Total.
Tons of ore milled.....	334,750	106,486	441,236
Average value per ton.....			\$10.11
Total values sent to mill.....			\$3,384,666.84
Average tons per day.....			917
Per cent of possible running time.....			93.8
Average tons per 24 hours of running time.....			978
Stamp duty tons per 24 hours of running time.....			14.72

Unrecovered values:—

Concentrates stored for re-treatment (9,500 tons).....	\$81,763.00
Lost in filter tails.....	133,090.00

Total..... \$214,853.00

Values recovered.....	\$3,169,813.84
Value per ton in tailings.....	0.40
Cyanide consumed per ton of ore, in pounds.....	0.574
Lime.....	1.896
Zinc.....	0.467
Acid.....	0.0032
Lead acetate.....	0.0021
Tons of solution precipitated per ton of ore.....	1.909
Zinc added per ton of solution.....	0.244
Average value of pregnant solution.....	5.074

Year.	Ore milled in tons.	Value recovered.	Dividends paid.
1911.....	1,000	\$ 46,082.52	.....
1912.....	45,195	933,682.00	\$ 270,000
1913.....	138,291	2,466,220.24	1,170,000
1914.....	208,936	2,688,354.80	1,170,000
1915.....	334,749	3,249,698.33	1,560,000
Total.....	728,171	9,384,037.89	4,170,000

COMPARATIVE COSTS PER TON FOR THE YEARS 1913-14-15.

	1913.	1914.	1915.
Tons milled per day.....	379	584	917
Cost per ton of:—			
Mining.....	\$3.09	\$2.10	\$1.89
Milling.....	1.63	1.22	1.00
General.....	1.38	1.10	.65
Depreciation.....	.88	.79	.44
Total.....	\$6.97	\$5.21	\$3.98

“During the past year we have succeeded in reducing the actual working costs to \$3.41 per ton, and were it not for the possibility of advances in the prices of supplies, I should not hesitate to promise a reduction from the coming year which would show a net cost of approximately \$3.10 per ton.

“The results of expenditures upon plant have shown steadily increasing tonnages and steadily decreasing costs.

“We have now altered our concentrate treatment plant so that it is no longer desirable to stack this product for future treatment, and we shall

as rapidly as possible reclaim those concentrates which have been conserved during the past two years.

"It is expected that by means of new alterations the capacity of the mill will be raised to 1,900 tons per day, and that a slightly improved extraction will be obtained owing to the increased agitation provided." (P. A. Robbins, General Manager).

The report contains a most interesting table on the cost of supplies and the advance in prices.

The estimated ore reserves are reported as being 1,600,800 tons, valued at \$16,031,600, or \$10.02 per ton.

McIntyre, Porcupine Mines.

Year ending March 31, 1916:—

Tons of ore milled.....	105,758
Average value.....	\$7.709
Extraction per ton.....	\$7.375
Tailing loss per ton.....	\$0.334
Gross value.....	\$815,345.49
Bullion produced and by-products obtained.....	779,990.94
Total loss in tails.....	35,354.50
Per cent of extraction.....	95.6
Cost per ton of ore milled.....	\$4.28
Profit.....	\$3.09
Per cent of possible running time.....	94.4

"Since the beginning of milling operations in 1912 to the end of the fiscal year the property has produced in gold bullion \$1,800,241.28 recovered from milling 237,891 tons of ore of an average value of \$8.10.

"The estimated ore reserves, as of March 31, 1916, were 201,920 tons, valued at \$2,247,128 or an average value of \$11.12 per ton."

Porcupine Crown Mines, Limited.

Year ending December 31, 1915:—

	Mine ore.	Amalgamation. Tails.	Total.
Tons of ore milled.....	41,326	5,093	46 419
Average value of heads.....	\$14.46	\$3.15	
" extraction.....	0.336	0.45	
Cost per ton of ore milled.....	97.70%	85.77%	
Gross value of production.....	\$ 6.72	\$0.97	\$6.09
Mint charges.....			\$615,537.60
Mine operation expense.....			1,972.17
net profit.....			282,916.88
Dividend paid in 1915.....			330,648.55
			240,000.00

"While the change in the character of the ore body reduces the grade per ton, the increase of tonnage gives us practically the same gold contents in the vein.

"Operating costs were appreciably reduced and the extraction in the mill was increased."

Porcupine Vipond Mines, Limited.

Year ending December 31, 1915:—

Tons of ore milled.....	35,899
Gross value of ore treated.....	\$269,667.42
Average value per ton treated.....	7.51
Loss " " (tailings).....	0.59
Recovery " ".....	6.92
Extraction.....	92.1%
Gold bullion produced (11,978.66 fine oz.).....	247,598.56
Silver " " (1,455.39 ").....	713.73
Total value recovered.....	248,312.29
" lost in tailings.....	21,355.13

"Present cost of supplies as compared with costs of 1914 show increases approximately as follows: Explosives 50 per cent; cyanide 33 per cent; zinc dust 300 per cent; other materials, such as steel, oils, pipe fittings and general supplies 10 to 20 per cent—nevertheless in spite of the considerable increased cost of these supplies, we have been successful in making our total costs for this year, lower than heretofore.

"Different improvements during the year have brought the capacity of the mill up to 3,600 tons per month.

"The increase in the capacity of the mill has resulted in lowering costs from \$6.44 per ton in 1914 to \$5.47 in 1915."

Schumacher Gold Mines, Limited.

Year ending June 30, 1916—(nine months only):—

Tons of ore milled.....	30,120
Operating cost.....	\$132,059.45
Bullion production.....	163,992.20
Net profit.....	31,932.75

"The mill has been in operation since the middle of September, 1915, and is treating at present about 140 tons per day.

"The average cost per ton for the five months ending February 29, 1916, was \$4.96, and the average cost per ton for the four months ending June 30, 1916, was \$3.88.

"The total ore reserves amount to 64,900 tons with an estimated value of \$396,700 or \$6.11 per ton."

Manitoba.

There was no production in Manitoba, during 1915, but development work was reported from Star lake, near the eastern boundary of the Province, and from Rice Lake, Long Lake, and Gold Lake districts, east of Lake Winnipeg.

Herb Lake.—Gold bearing quartz veins of a promising character have been found on the east side of Wekusko or Herb lake, about 85 miles northeast of Pas.

Flin Flon Lake.—About 70 miles northwest of Pas on the Saskatchewan boundary much activity has been shown, especially near Flin Flon lake, and Schist lake. Extensive diamond drilling done by the Great Sulphides Gold Mines, Ltd., in this district, has been reported.

Mr. E. L. Bruce of the Geological Survey who is conducting an exploration of this area reports that:—

"Gold-bearing quartz veins have now been discovered in so many parts of the belt of basic rocks extending from Amisk lake (in Saskatchewan) to Wekusko lake (in Manitoba), that there seem to be good possibilities of finding gold in paying quantities. Careful examination requires time and work. This is especially true in the eastern part where the thick deposits of Lake Agassiz clays mantle the rock surfaces. All parts of the area are easily accessible by canoe travel, but thorough prospecting will demand examination of the country inland from the main routes, and attention concentrated on a few promising claims rather than dissipated over a large number."

Saskatchewan.

In the autumn of 1913 considerable interest was created in the reported gold discoveries at Beaver lake (Amisk lake). A number of prospectors went in with the opening of navigation. A good deal of prospecting was done during 1914, and some further work in 1915, but as yet no production has been reported. Amisk lake is at the western end of the area being examined by Mr. Bruce and referred to under "Manitoba."

Alberta.

In past years there has been a small production of gold from the gravels of the Saskatchewan river. A recovery was reported for 1915 amounting to 195 ounces valued at \$4,026, as against 48 ounces, valued at \$992 in 1914.

Statistics of the production from Alberta, since 1887, are shown in the following table:—

Alberta: Annual Production of Gold.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1887.....	102	\$ 2,100	1897....	2,419	\$ 50,000	1907....	33	\$ 675
1888.....	58	1,200	1898....	1,209	25,000	1908....	50	1,037
1889.....	967	20,000	1899....	726	15,000	1909....	25	525
1890.....	193	4,000	1900....	242	5,000	1910....	89	1,850
1891.....	266	5,500	1901....	726	15,000	1911....	10	207
1892.....	508	10,506	1902....	484	10,000	1912....	73	1,509
1893.....	466	9,640	1903....	48	1,000	1913....	.....	.....
1894.....	726	15,000	1904....	24	500	1914....	48	992
1895.....	2,419	50,000	1905....	121	2,500	1915....	195	4,026
1896.....	2,661	55,000	1906....	39	800	Total....	14,927	308,567

‡Calculated from the value: one dollar = 0.048375 oz.

British Columbia.

The gold production of British Columbia in 1915 amounted to 273,376 fine ounces, valued at \$5,651,184 and comprising: (a) placer gold \$770,000, or 13.6 per cent of the total; (b) bullion from milling ores \$405,334, or 7.2 per cent, and (c) smelter recoveries \$4,475,850, or 79.3 per cent.

The statistics of lode gold represent, as closely as can be ascertained, the actual gold recovery based on smelter recoveries and bullion shipments.

There was an increase of 36 per cent in the placer production over that of 1914; a decrease of 27 per cent in the bullion from milling ores; and an increase of 9 per cent in smelter recoveries.

In 1914 the total production was 252,730 ounces, valued at \$5,224,393 comprising: (a) placer gold \$565,000; (b) bullion from milling ores \$549,437; and (c) smelter recoveries \$4,109,956.

The total production in 1915 showed an increase of 8.2 per cent over that of 1914, and is due to the resuming of operations on a large scale in the Boundary and Rossland camps, to the successful operation of the Anyox plant, on the Pacific coast, and to a considerable increased placer production.

Statistics of the production in British Columbia, since 1858 are given in the following table:—

British Columbia: Annual Production of Gold.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1858.....	34,104	\$ 705,000	1878....	61,688	\$1,275,204	1898..	142,215	\$ 2,939,852
1859.....	78,129	1,615,072	1879....	62,407	1,290,058	1899..	203,295	4,202,473
1860.....	107,806	2,228,543	1880....	49,044	1,013,827	1900..	228,916	4,732,105
1861.....	128,973	2,666,118	1881....	50,636	1,046,737	1901..	257,292	5,318,703
1862.....	128,528	2,656,903	1882....	46,154	954,085	1902..	288,383	5,961,409
1863.....	189,318	3,913,563	1883....	38,422	794,252	1903..	284,108	5,873,036
1864.....	180,722	3,735,850	1884....	35,612	736,165	1904..	275,975	5,704,908
1865.....	168,887	3,491,205	1885....	34,527	713,738	1905..	285,529	5,902,402
1866.....	128,779	2,662,106	1886....	43,714	903,651	1906..	269,886	5,579,039
1867.....	120,012	2,480,868	1887....	33,558	693,709	1907..	236,216	4,883,020
1868.....	114,792	2,372,972	1888....	29,834	616,731	1908..	286,858	5,929,880
1869.....	85,865	1,774,978	1889....	28,489	588,923	1909..	250,320	5,174,579
1870.....	64,675	1,336,956	1890....	23,918	494,436	1910..	261,386	5,403,318
1871.....	87,048	1,799,440	1891....	20,792	429,811	1911..	238,496	4,930,145
1872.....	77,931	1,610,972	1892....	19,327	399,525	1912..	251,815	5,205,485
1873.....	63,166	1,305,749	1893....	18,360	379,535	1913..	297,459	6,149,027
1874.....	89,233	1,844,618	1894....	25,664	530,530	1914..	252,730	5,224,393
1875.....	119,724	2,474,904	1895....	61,289	1,266,954	1915..	273,376	5,651,184
1876.....	86,429	1,786,648	1896....	86,504	1,788,206			
1877.....	77,796	1,608,182	1897....	131,805	2,724,657	Total..	7,617,916	157,476,339

‡Calculated from the value: one dollar = 0.048375 oz.

The record of production of placer gold is given as ascertained by the Provincial Mineralogist, who, in his Annual Report states that:—

“Great difficulty is found in obtaining reliable figures, since the work is, in many cases, carried out by individuals or unorganized groups of men who keep no books, frequently paying wages, or for supplies, in gold-dust, which, being readily transported, is scattered, and the tax imposed thereon by law is thus evaded.

"This year's output shows an increase, as compared with 1914, of \$205,000, chiefly due to a better season than usual in the Atlin and Cariboo districts.

"Considerable work in connection with placer-mining was done in the Similkameen District, although the actual production was small.

"The production of placer gold is nearly all from the Atlin and Cariboo Districts; about 90 per cent of the total coming from these two sections."

The production of gold from lode mining as reported by The Provincial Bureau of Mines being based upon metal contents of ore shipments is naturally somewhat higher than the record of smelter recoveries. According to the Provincial Mineralogist: "The value of the gold produced from lode-mining in the Province during the year 1915, was \$5,167,934, an increase, as compared with the previous year of \$58,930, or about 1.15 per cent. This greater production of lode gold is due to an increased tonnage of ore mined in the Boundary and Rossland Districts, and to new mines recently opened in the Skeena and Omineca Districts.

"These increases were however, somewhat offset by decreases in the Nelson and Coast Districts.

"The only large stamp-mill in operation in the Province is at the Nickel Plate mine at Hedley, in the Osoyoos Mining Division, which, this past year, milled some 74,265 tons of ore having a value of over \$900,000. There are smaller stamp-mills operating at the Poorman, Queen, Mother Lode, and other mines in the Nelson Division; and in addition there are stamp-mills at the Jewel mine, Greenwood; Coronation mine, Lillooet; and Engineer mine, Atlin, which operated during the year.

"The following are the values of the gold product of the three most important camps; Rossland \$2,947,439; Boundary \$1,816,273; and Nelson \$190,846. About 76.5 per cent of the gold production of the Province is obtained from the smelting of copper-bearing ores, the remainder mainly from stamp-milling."

The following table shows the production by districts as recorded by the British Columbia Bureau of Mines:—

British Columbia: Production of Gold by Districts, 1915.*

Districts.	GOLD PLACER.		GOLD LODE.	
	Ounces.	Value.	Ounces.	Value.
Cariboo:—				
Cariboo.....	10,750	\$ 215,000	.....	\$.....
Quesnel.....	4,250	85,000	.....	.....
Omineca.....	600	12,000	1,524	31,501
Cassiar:—				
Atlin.....	18,850	377,000	875	18,086
All others.....	1,450	29,000	5,034	104,053
East Kootenay:—				
Fort Steele.....	750	15,000	.....	.....
West Kootenay:—				
Ainsworth.....	.....	.....	121	2,501
Nelson.....	50	1,000	9,233	190,846
Slocan.....	.....	.....	26	537
Trail creek.....	.....	.....	142,595	2,947,439
Others.....	100	2,000	15	310
Lillooet—Lilloet.....	400	8,000	31	641
Vale:—				
Grand Forks, Greenwood and Osoyoos.....	100	2,000	87,870	1,816,273
Similkameen, Nicola, and Vernon.....	600	12,000	101	2,088
Vale, Ashcroft and Kamloops.....	500	10,000	106	2,191
Coast.....	100	2,000	2,490	51,468
Total.....	38,500	\$ 770,000	250,021	\$5,167,934

*From Annual Report of the Minister of Mines for British Columbia.

Yukon.

The gold production of the Yukon in 1915 was \$4,758,098 as compared with \$5,125,374 in 1913, a decrease of 7.1 per cent. This includes a small production from lode mines.

The placer production of the Yukon in 1915 is estimated at 229,803 fine ounces of gold, valued at \$4,750,450, and 51,706 fine ounces of silver, valued at \$25,689, making the total valuation of the Yukon placer output \$4,776,139.

The placer production in 1914 was estimated at 247,753 fine ounces of gold, valued at \$5,121,509, and 55,744 fine ounces of silver, valued at \$30,554, or a total valuation of \$5,153,063.

Statistics of the annual production of gold in Yukon since 1885, are shown in the following table:—

Annual Production of Gold in Yukon.

Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.	Year.	Fine ounces.‡	Value.
1885)....			1896... 14,513	\$ 300,000	1907... 152,381	\$ 3,150,000		
1886)....	4,837	\$ 100,000	1897... 120,937	2,500,000	1908... 174,150	3,600,000		
1887.....	3,386	70,000	1898... 483,750	10,000,000	1909... 191,565	3,960,000		
1888.....	1,935	40,000	1899... 774,000	16,000,000	1910*.. 221,091	4,570,362		
1889.....	8,466	175,000	1900... 1,077,553	22,275,000	1911*.. 224,197	4,634,574		
1890.....	8,466	175,000	1901... 870,750	18,000,000	1912*.. 268,447	5,549,296		
1891.....	1,935	40,000	1902... 701,437	14,500,000	1913*.. 282,838	5,846,780		
1892.....	4,233	87,500	1903... 592,594	12,250,000	1914*.. 247,940	5,125,374		
1893.....	8,514	176,000	1904... 507,938	10,500,000	1915*.. 230,173	4,758,098		
1894.....	6,047	125,000	1905... 381,001	7,876,000				
1895.....	12,094	250,000	1906... 270,900	5,600,000	Total	7,848,068	162,233,984	

†Calculated from the value: one dollar = 0.048375 oz.

*Including a small production from lode mines.

The statistics of production of gold in the Yukon district during the years between 1898 and 1906, as given in the table showing the annual production, are based primarily on the receipts of gold at the United States mints and receiving offices credited to the Canadian Yukon. Although a royalty was exacted on the gold output, it seems certain that considerable amounts of gold were produced which escaped royalty payment especially during the years of high production.

Since 1906 the statistics of gold production of the Yukon have been based on the royalty of $2\frac{1}{2}$ per cent which is collected by the Interior Department. For the purpose of collecting the royalty, a fixed value of \$15 per ounce is placed on the crude gold. The actual value of the deposits for a number of years, has been about \$16.50 per ounce. At the Dominion Government assay office at Vancouver, B.C., there were deposited during the twelve months ending December 31, 1915, 87,040.87 ounces from the Yukon, valued, after all charges had been deducted, at \$1,418,496.63, showing an average of \$16.28 per ounce, as against 56,564.83 ounces, valued at \$916,914.44, or an average of \$16.21 per ounce in 1914.

The production of crude placer gold in the Yukon during the past six years, as ascertained by the Interior Department, and upon which a royalty of $2\frac{1}{2}$ per cent has been collected, is shown in the accompanying table:—

Production of Gold in the Yukon District.

(Gross weight of dust, nuggets and bullion in ounces.)

Month.	1910.	1911.	1912.	1913.	1914.	1915.
January.....	16.68	.....	5.25	19.30	136.50	520.69
February.....	749.28	435.66	525.29	56.90	325.50	.40
March.....	193.81	13.30	0.50	.....	6.75	232.13
April.....	0.50	.....	.....	1,293.69	1,572.65	277.84
May.....	43.83	16,719.16	26,158.66	5,557.35	11,668.10	17,553.29
June.....	54,301.17	38,499.39	54,243.03	67,594.39	67,604.85	57,884.87
July.....	37,942.31	42,783.38	58,283.29	57,873.50	45,067.31	49,478.87
August.....	47,673.06	47,677.49	56,975.55	63,315.92	49,458.17	41,015.41
September.....	57,695.65	48,383.63	53,225.29	58,641.62	62,744.69	47,055.83
October.....	51,888.18	58,690.82	66,518.01	66,798.37	63,365.22	59,984.89
November.....	21,404.29	11,097.51	11,648.08	26,565.50	4,308.00	7,248.17
December.....	3,563.75	13,130.63	7,432.72	5,183.50	3,433.43	6,001.77
	275,472.51	277,430.97	335,015.67	352,900.04	309,691.17	287,254.16

Since 1898 a royalty to the extent of \$4,372,504.98 has been collected on the gold production of this district. The yearly amounts collected, as well as the annual production of gold as ascertained by the Interior Department, are shown in the accompanying table. The difference between these figures and those shown in the table of annual production of the district which are based on mint receipts of Yukon gold, has already been mentioned, and is probably due to three factors: (1) the fixing of the value of the gold for royalty purposes at \$15 per ounce, a figure probably

slightly less than the actual value of the gold, (2) the probability that in the earlier years of royalty collection, considerable quantities of gold dust left the camps unrecorded and escaped royalty payments, and (3) the fact that in the last few years there has been a small but growing production from the lode mines.

Gold Production in the Yukon, and Royalty Collected.†

Fiscal Year.	Total gold production.	Total exemption.	Royalty collected on.	Royalty paid.
Ending June, 1898.....	\$ 3,072,773	\$ 339,845	\$ 2,732,928	\$273,292.82
" " 1899.....	7,582,283	1,699,657	5,882,626	588,262.37
" " 1900.....	9,809,464	2,501,744	7,307,720	730,771.99
" " 1901.....	9,162,082	1,927,666	7,234,416	592,660.98
" " 1902.....	9,566,340	1,199,114	8,367,225	331,436.79
" " 1903.....	12,113,015	.....	12,113,015	302,893.48
" " 1904.....	10,790,663	.....	10,790,663	272,217.96
" " 1905.....	8,222,054	.....	8,222,054	206,760.87
" " 1906.....	6,540,007	.....	6,540,007	163,963.25
" March 1907.....	3,304,791	.....	3,304,791	82,622.42
" " 1908.....	2,820,162	.....	2,820,162	70,505.65
" " 1909.....	3,260,282	.....	3,260,282	81,507.07
" " 1910.....	3,594,251	.....	3,594,251	89,844.10
" " 1911.....	4,126,728	.....	4,126,728	103,168.19
" " 1912.....	4,024,237	.....	4,024,237	100,606.29
" " 1913.....	5,018,412	.....	5,018,412	125,460.52
" " 1914.....	5,301,508	.....	5,301,508	132,537.69
" " 1915.....	4,649,634	.....	4,649,634	116,241.04

†From the Report of the Yukon and Mining Lands Branch of the Department of the Interior.

IRON AND STEEL

INTRODUCTORY

The year 1915, particularly the later months, was marked by a steady renewal of activity in the iron and steel industry, due not so much to industrial demands for Canadian consumption, as to the requirements of steel for munitions and the export demand for billets and wire.

The shipments of iron ore are the largest recorded with the exception of 1902. The production of pig-iron was practically equivalent to that of 1911, having been exceeded only in 1912 and 1913, while the production of steel ingots and castings was exceeded only in 1913.

Summary of Iron and Steel Statistics, 1912-1915.

	1912.	1913.	1914.	1915.
Iron ore shipped..... Short tons	215,883	307,634	244,854	398,112
Canadian iron ore charged to blast furnaces .. "	71,588	139,436	182,964	293,305
Imported iron ore charged to blast furnaces .. "	2,019,165	2,110,828	1,324,326	1,463,488
Iron ore charged to steel furnaces..... "	43,006	55,018	37,686	74,872
Pig-iron made..... "	1,014,587	1,128,967	783,164	913,775
Pig-iron and ferro-alloys, exported..... "	6,976	6,326	19,063	26,545
Pig-iron imported..... "	272,565	236,769	78,680	47,842
Ferro-alloys made..... "	7,834	8,075	7,524	10,794
Ferro-alloys imported..... "	19,810	30,355	22,147	13,758
Pig-iron and ferro-alloy consumption..... "	1,307,820	1,397,840	872,452	959,254
Pig-iron used in steel furnaces..... "	735,559	913,722	619,030	747,834
Steel ingots and castings made..... "	957,681	1,168,993	828,641	1,020,336
Steel rails made..... "	471,422	554,481	428,225	232,411
Canadian coke used in iron blast furnaces.. "	609,183	710,260	330,269	578,743
Imported coke used in iron blast furnaces.. "	656,815	706,888	590,902	486,022
Iron and steel imported..... "	(b) 1,369,150	(c) 1,890,506	(c) 878,179	(c) 771,007
Number of completed blast furnaces..... No.	19	22	22	19
Number of men employed in blast furnaces.. "	1,358	1,589	1,018	1,004
Wages paid in blast furnaces.....\$	993,941	1,149,345	693,632	675,453
Value of pig-iron produced.....\$	14,550,999	16,540,012	10,002,856	11,374,199
Value of iron and steel goods exported. (c).....\$	10,682,484	13,999,149	14,391,746	48,268,148
Value of iron and steel goods imported. \$	(b) 105,614,450	(c) 145,226,972	(c) 79,762,262	(c) 74,308,983

(b) Figures cover the fiscal year ending March 31 and include all iron and steel goods for which weights are given.

(c) Figures cover the calendar year.

Canadian iron blast furnaces continue to be operated largely on imported ores and fuels, only about 17 per cent of the ore consumption and 54 per cent of the fuel used in 1915 being of domestic origin.

The imports of iron and steel which reached a maximum in 1913 show a further falling off in 1915 amounting in value to just half that of the former year. The exports, however, continue to increase, the value in 1915 being over three times that of the exports in 1914.

During the earlier months of the year, low prices, a restricted market, and sharp competition pressed heavily upon the operators forcing the marketing of steel at the lowest possible margin. As the year progressed, however, the enormous demand for munitions and war requirements rapidly absorbed available stocks until before the close of the year market requirements could not be met. The installation of new open-hearth furnaces was undertaken at several plants, while a number of small electric furnace units were also constructed and others projected in an attempt to meet the demand.

The following table compiled and published by the "Iron Trade Review," Cleveland, O., shows in a comprehensive way the variation in price during 1915 of all the more important classes of iron and steel products, clearly indicating the rapid upward tendency during the last six months of the year.

Average Monthly Prices* of Iron and Steel Products at Pittsburgh in 1915.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Bessemer pig-iron.... per ton	\$14.70	\$14.63	\$14.55	\$14.55	\$14.55	\$14.58	\$14.88	\$15.89	\$16.80	\$16.95	\$17.45	\$19.70
Basic pig-iron.... "	13.45	13.45	13.45	13.45	13.45	13.54	13.83	14.89	15.65	15.95	16.70	18.55
Foundry pig-iron.... "	13.70	13.95	13.80	13.45	13.45	13.45	13.60	14.70	15.45	15.57	16.45	18.85
Malleable pig-iron.... "	13.70	13.70	13.45	13.45	13.45	13.45	13.60	14.70	15.45	15.57	16.45	18.85
Grey forge pig-iron.... "	13.45	13.45	13.45	13.40	13.20	13.20	13.20	14.20	14.95	15.07	15.88	18.15
Ferro-Manganese, Balt "	68.00	68.00	70.00	90.00	88.00	95.00	98.00	97.00	109.00	108.00	99.00	100.00
Ferro-silicon..... "	73.00	73.00	73.00	73.00	73.00	73.00	73.00	73.00	73.00	79.00	83.75	83.00
Open-hearth billets.... "	19.50	19.50	19.50	19.50	19.50	19.87	21.40	23.00	24.60	25.00	27.75	29.60
Bessemer sheet bars.... "	19.50	19.50	19.50	19.50	19.50	19.87	21.40	23.00	24.60	25.00	27.75	29.60
Open-hearth sheet bars.... "	20.00	20.00	20.00	19.60	19.50	20.37	21.70	24.00	25.60	26.50	28.00	30.20
Bessemer sheet bars.... "	20.00	20.00	20.00	19.60	19.50	20.37	21.70	24.00	25.60	26.50	28.00	30.20
Open-hearth sheet bars.... "	20.00	20.00	20.00	19.60	19.50	20.37	21.70	24.00	25.60	26.50	28.00	30.20
Steel rails..... per lb.	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Beams..... "	1.10	1.10	1.15	1.15	1.20	1.20	1.25	1.30	1.32	1.41	1.625	1.74
Plates..... "	1.10	1.10	1.15	1.15	1.20	1.20	1.25	1.30	1.32	1.41	1.625	1.74
Steel bars..... "	1.10	1.10	1.15	1.15	1.20	1.20	1.25	1.30	1.32	1.41	1.625	1.74
Iron bars..... "	1.10	1.10	1.15	1.20	1.20	1.20	1.25	1.30	1.34	1.41	1.60	1.84
Tin plate..... "	3.10	3.10	3.10	3.20	3.18	3.10	3.10	3.10	3.10	3.10	3.35	3.60
No. 28 black sheets.... "	1.80	1.80	1.80	1.80	1.80	1.80	1.77	1.83	1.92	2.05	2.22	2.50
No. 28 Gal. sheets.... "	2.77	3.01	3.40	3.30	3.40	4.46	4.55	3.93	3.67	3.50	3.90	4.75
No. 10 blue sheets.... "	1.30	1.30	1.30	1.30	1.35	1.35	1.35	1.36	1.52	1.60	1.85	2.25
Wire rods..... per ton	25.00	25.00	25.00	25.00	25.00	25.00	25.00	26.75	28.50	30.00	34.50	39.00
Wire nails..... per lb.	1.51	1.55	1.60	1.59	1.55	1.55	1.59	1.61	1.69	1.76	1.87	1.98
Plain wire..... "	1.31	1.35	1.40	1.39	1.35	1.35	1.39	1.42	1.54	1.62	1.72	1.83
Hoops..... "	1.25	1.25	1.25	1.25	1.25	1.25	1.26	1.32	1.42	1.52	1.75	1.94
Heavy melting..... per ton	11.55	11.62	12.00	11.90	11.75	11.75	11.75	13.38	14.25	14.00	15.31	17.40
Structural rivets..... per lb	1.45	1.45	1.45	1.45	1.45	1.49	1.50	1.50	1.61	1.75	2.28	2.40

* From the Iron Trade Review, Cleveland, O.

IRON ORE

Active mining operations were conducted at three mines only during 1915, viz.: The "Helen" and "Magpie," in the Michipicoten district, and the "Moose Mountain," north of Sudbury. Small shipments were made from stock at two other properties.

The total shipments during the year were 398,112 tons, valued at \$774,427, as compared with 244,854 tons, valued at \$542,041, shipped in 1914. Of the total shipments in 1915, 308,382 tons were sent to blast furnaces in Canada and 89,730 tons to the United States.

The shipments included 205,989 tons of hematite, 132,906 tons of roasted siderite, and 59,217 tons of magnetite (including some ores with an admixture of hematite). Shipments in 1914 included 89,454 tons of hematite; 109,838 tons of roasted siderite, and 45,562 tons of magnetite.

All iron properties in the eastern Provinces of Nova Scotia, New Brunswick, and Quebec have been idle throughout 1914 and 1915, although small shipments were made from Bathurst mine stock of 3,683 tons in 1915 and 4,775 tons in 1914. These ores would average about 46½ per cent iron.

In Quebec, the Manitou Iron Mining Co. opened up their mine at Ivry-on-the-Lake in Terrebonne county on the 4th of December, and have undertaken to make considerable shipments of ilmenite during 1916.

In Ontario the "Helen" and "Magpie" mines were operated throughout the year by The Algoma Steel Corporation. From the "Helen" mine there was shipped to the Company's blast furnace at Sault Ste. Marie, about 205,989 tons of hematite ore averaging 52 per cent iron. This mine has to its credit the largest iron ore production of any mine in the Dominion, the shipments from the commencement of operations in 1900 to the end of 1915 having been 2,263,522 gross tons (2,535,145 short tons). In addition there was shipped from 1906 to 1915 inclusive 37,572 gross tons (42,081 short tons) of iron pyrites. The ore body has been almost completely worked over and the comparatively small tonnage extracted during recent years has come principally from caved ore and from pillars left when the ore was extracted by stoping.

Shipments from the "Magpie" mine during 1915 were 132,906 tons of roasted siderite, carrying 50 per cent iron of which a portion was sold in the United States. The roasting plant at the "Magpie" includes six rotary kilns each 8 feet in diameter and 125 feet long. Rotary cylindrical coolers convey the hot roasted ore to the stock yard. The kilns are fired with pulverized coal. All the mine equipment is operated by electricity generated at Steep Hill Falls on the Magpie river about 12 miles distant. The siderite ore has an iron content of about 35 per cent and an objectionable amount of sulphur, while the average analysis of the roasted ore (1914 shipments) was as follows in percentages: iron 50·60; silica 9·39; sulphur 0·25; phosphorus 0·011; alumina 1·02; lime 8·79; magnesia 7·05; manganese 2·71.

The first shipments were made in 1913 and the total shipments during three years have been 236,671 gross tons (265,072 short tons).

The Moose Mountain mines, at Sellwood, Ont., owned by Moose Mountain, Ltd., were operated for less than two months closing down on May 28. Shipments included 53,277 tons of cobbled ore from stock pile averaging 54.25 per cent iron, and 1,882 tons of briquettes averaging 63.02 per cent iron.

These magnetite ores have been under development since 1906, and total shipments to the end of 1915 have been 323,049 gross tons (361,815 short tons). A magnetic cobbing plant was installed in 1909 and enlarged in 1910. In 1912 a Gröndal concentrating and briquetting plant was erected for the purpose of treating the low grade siliceous ore comprising the major portion of the Company's ore reserves. Experimental operations have been carried on intermittently at this plant since its installation, and are still in progress.

The mines of the Canada Iron Mines, Ltd., "Bessemer" and "Childs" in Mayo township and Coe Hill in Wollaston township, as well as the magnetic concentrating plant at Trenton, remained idle throughout 1915, although a small tonnage of concentrates was sold during the year. The entire remaining stock of concentrates at Trenton amounting to about 14,200 tons, was sold in December for 1916 delivery and will be included in next year's record.

Production of Iron Ore by Provinces, 1913-14-15.

Provinces.	1913.		1914.		1915.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
New Brunswick.....	86,416	\$ 153,820	4,775	\$ 10,841	3,683	\$ 8,261
Nova Scotia.....	20,436	21,049	.....	.....	.....	.....
Quebec.....	5,102	26,999	.....	.....	.....	.....
Ontario.....	195,680	427,975	240,079	531,200	394,429	766,166
	307,634	629,843	244,854	542,041	398,112	774,427

Production of Iron Ore by Classes of Ore, 1907-1915.

IN SHORT TONS.

Year.	Hematite.	Magnetite.	Carbonate including siderite.	Bog ore.	Total.
1907.....	205,795	50,073	42,740	14,248	312,856
1908.....	173,164	49,946	4,869	10,103	238,082
1909.....	190,473	74,240	.....	3,330	268,043
1910.....	130,380	127,768	.....	1,270	259,418
1911.....	137,399	72,945	.....	.....	210,344
1912.....	86,971	128,912	.....	.....	215,883
1913.....	*92,386	215,248	.....	.....	307,634
1914.....	89,454	45,562	109,838	.....	244,854
1915.....	205,989	59,217	132,906	.....	398,112

*Small tonnage of siderite included.

A record of the production by provinces in past years is shown in the accompanying tables. There was a considerable production in Ontario previous to 1886, which is not recorded.

Production of Iron Ore by Provinces, 1886-1915.

Calendar Year.	New Brunswick.	Nova Scotia.	Quebec.	Ontario.	British Columbia.	Total. Short tons.
1886.....	44,388	.....	16,032	3,941	64,361
1887.....	43,532	13,404	15,698	2,796	76,330
1888.....	42,611	10,710	16,894	8,372	78,587
1889.....	54,161	14,533	.....	15,487	84,181
1890.....	49,206	22,305	.....	.....	76,511
1891.....	53,649	14,380	.....	950	68,979
1892.....	78,258	22,690	.....	2,300	103,248
1893.....	102,201	22,076	.....	1,325	125,602
1894.....	89,379	19,492	.....	1,120	109,991
1895.....	83,792	17,783	.....	1,222	102,797
1896.....	58,810	17,630	15,270	196	91,906
1897.....	23,400	22,436	2,770	2,099	50,705
1898.....	19,079	17,873	21,111	280	58,343
1899.....	28,000	19,420	25,126	2,071	74,617
1900.....	18,940	19,000	82,950	1,110	122,000
1901.....	18,619	15,489	272,538	7,000	313,646
1902.....	16,172	18,524	359,288	10,019	404,003
1903.....	40,335	12,035	209,634	2,290	264,294
1904.....	61,293	16,152	141,601	.....	219,046
1905.....	84,952	12,681	193,464	.....	291,097
1906.....	97,820	9,933	141,078	.....	248,831
1907.....	89,839	12,748	207,769	2,500	312,856
1908.....	11,802	10,103	216,177	.....	238,082
1909.....	4,150	263,893	.....	268,043
1910.....	5,336	18,134	4,503	231,445	.....	259,418
1911.....	31,120	22	3,616	175,586	.....	210,344
1912.....	71,520	30,857	1,185	112,321	.....	215,883
1913.....	86,416	20,436	5,162	195,680	.....	307,634
1914.....	4,775	.....	.....	240,079	.....	244,854
1915.....	3,683	.....	.....	394,429	.....	398,112

Production of Iron Ore in Nova Scotia, 1876-1885.

Calendar Year.	Short tons.	Calendar Year.	Short tons.
1876.....	15,274	1881.....	39,843
1877.....	16,879	1882.....	42,135
1878.....	36,600	1883.....	52,410
1879.....	29,889	1884.....	54,885
1880.....	51,193	1885.....	48,129

EXPORTS AND IMPORTS OF IRON ORE

According to returns received direct from the mine operators, 89,730 tons of ore were shipped to the United States during 1915, as against 60,410 tons in 1914, these being the total shipments outside of Canada. The shipments to destinations outside of Canada in 1913 totalled 216,614 tons, and included 196,151 tons to the United States; 12,927 tons to Scotland, and 7,536 tons to Holland. The Department of Customs reports the exports during the three years as 79,770 tons in 1915; 135,451 tons in 1914, and 126,124 tons in 1913.

There were charged to Canadian blast furnaces in 1915, 1,463,488 tons of imported ores, as compared with 1,324,326 tons in 1914. The annual consumption of imported ores in blast furnaces, which, previous to 1912, was the only record of imports, is shown in the table "Iron Ore, Fuel and Flux charged to Blast Furnaces."

The total quantity of ores thus consumed since 1896 has been 17,444,296 tons. The imported ores charged in 1915 included 840,394 tons from Newfoundland, and 623,094 tons of "Lake Ores."

The imports during 1915, according to the records of the Customs Department, were 1,504,113 tons, valued at \$2,331,755, as compared with 1,147,108 tons, valued at \$2,387,358 imported in 1914. The 1915 imports included 715,060 tons, valued at \$1,568,866 from the United States; 24 tons, valued at \$561 from Great Britain, and 762,328 tons from other countries (Newfoundland).

The iron ore deposits at Wabana, Newfoundland, are owned and operated by the two Canadian companies operating coal mines and steel plants at Sydney and Sydney Mines, Cape Breton. The shipments from the Wabana mines during 1915 were 868,451 short tons, of which 802,128 tons were shipped to Sydney and 66,323 tons to the United Kingdom. The total shipments from Wabana since the mines were first operated in 1895, have amounted to 15,525,636 short tons, of which 9,726,881 tons were sent to Sydney; 2,078,197 tons to the United States, and 3,720,558 tons to Great Britain and Europe. A complete record of the shipments from Wabana is shown in tabular form.

A record of the tonnage of iron ores received from the United States is presented in the Table "Exports of Iron Ore from the United States to

Canada," compiled from "United States Report of Commerce and Navigation." According to this record the exports to Canada during the twelve months ending June, 1915, were 455,869 short tons, valued at \$1,277,247, as against 1,125,090 tons, valued at \$3,401,146, during the previous year.

Exports of Iron Ore, Calendar Years 1893-1915.

Calendar Year.	Short tons.	Value.	Average value.	Calendar Year.	Short tons.	Value.	Average value.
1893.....	2,419	\$ 7,590	\$ 3.14	1904*.....	168,828	\$ 401,738	\$ 2.38
1894.....	21,294	21,294	.....	1905*.....	168,289	407,881	2.42
1895.....	1,571	3,909	2.49	1906.....	74,778	149,177	2.01
1896.....	1,033	1,911	1.85	1907.....	25,901	45,907	1.77
1897.....	403	811	2.01	1908.....	(a).....	.....	.....
1898.....	182	278	1.54	1909.....	21,956	61,954	2.82
1899.....	4,145	9,538	2.30	1910.....	114,499	324,186	2.83
1900.....	5,527	13,511	2.44	1911.....	37,686	133,411	3.54
1901*.....	306,199	762,283	2.49	1912.....	118,129	382,005	3.23
1902*.....	428,901	1,065,019	2.48	1913.....	126,124	426,681	3.38
1903*.....	368,233	922,571	2.51	1914.....	135,451	360,974	2.67
				1915.....	79,770	206,823	2.59

* The export figures for the five years indicated are incorrect owing to a duplication of entries.

(a) The figures of the Trade Report for this year include ferro-products, and are, therefore, omitted.

Imports* of Iron Ore into the United States from Canada, 1893-1915.

Year ending June 30.	Short tons.	Value.	Average value.	Year ending June 30.	Short tons.	Value.	Average value.
1893.....	7,706	\$ 17,186	\$ 2.23	1904.....	126,995	\$ 283,765	\$ 2.23
1894.....	301	756	2.51	1905.....	120,241	245,623	2.04
1895.....	2,681	10,114	3.77	1906.....	113,809	220,112	1.93
1896.....	39	142	3.64	1907.....	34,731	52,765	1.52
1897.....	2,535	5,243	2.07	1908.....	32,124	55,617	1.73
1898.....	1,313	2,904	2.21	1909.....	3,490	12,660	3.63
1899.....	2,585	5,120	1.98	1910.....	36,070	97,984	2.72
1900.....	4,477	5,550	1.24	1911.....	117,393	264,452	2.25
1901.....	34,453	76,159	2.21	1912.....	45,089	89,336	1.98
1902.....	309,527	685,540	2.21	1913.....	159,146	282,434	1.77
1903.....	144,725	320,263	2.21	1914.....	168,203	360,484	2.14
				1915.....	48,513	121,645	2.51

* Compiled from the "Foreign Commerce and Navigation of the United States."

Imports of Iron Ore, 1912-1915.

Calendar Year.	UNITED STATES.		NEWFOUNDLAND.		OTHER COUNTRIES.		TOTAL.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
1912 (9*mos)	1,206,567	\$3,090,207	840,892	\$840,892	50	\$ 975	2,047,509	\$3,932,074
1913.....	1,072,156	3,007,653	869,669	869,669	500	502	1,942,325	3,877,824
1914.....	749,979	1,972,550	389,850	389,850	7,279	24,958	1,147,108	2,387,358
1915.....	715,060	1,568,866	789,029	762,328	24	561	1,504,113	2,331,755

* Imports of iron ore separately stated in Customs Reports from April 1912 only.

Exports* of Iron Ore from the United States to Canada.

Year ending June 30.	Short tons.	Value.	Average value.	Year ending June 30.	Short tons.	Value.	Average value.
1896.....	1,270	\$ 4,042	\$ 3.18	1906.....	254,399	\$ 608,029	\$ 2.39
1897.....	10,942	34,168	3.12	1907.....	266,103	670,995	2.52
1898.....	12,921	34,224	2.65	1908.....	327,918	880,197	2.68
1899.....	33,598	60,497	1.80	1909.....	449,755	1,264,048	2.81
1900.....	45,237	78,542	1.74	1910.....	609,617	1,636,917	2.69
1901.....	67,994	175,689	2.58	1911.....	826,071	2,496,246	3.02
1902.....	76,457	178,107	2.45	1912.....	931,647	2,806,238	3.01
1903.....	86,258	264,755	3.07	1913.....	1,367,928	3,684,233	2.69
1904.....	92,577	252,254	2.72	1914.....	1,125,090	3,401,146	3.02
1905.....	264,214	529,454	2.00	1915.....	455,869	1,277,247	2.80

* Compiled from the "Foreign Commerce and Navigation of the United States."

Annual Shipments of Iron Ore from Wabana Mines, Newfoundland.

Calendar Year.	To Nova Scotia.	To United States.	To Great Britain and Europe.	Total shipments.
	Short tons.	Short tons.	Short tons.	Short tons.
1895.....	2,686			2,686
1896.....	17,410	22,798		40,208
1897.....	12,143	33,039	5,651	50,833
1898.....	34,622		78,640	113,262
1899.....	26,311	98,485	214,322	339,118
1900.....	195,507	153,867	14,776	364,150
1901.....	457,064	84,292	279,102	820,458
1902.....	376,322	96,702	341,421	814,445
1903.....	273,283	90,711	287,793	651,787
1904.....	342,710	6,025	298,694	647,429
1905.....	506,819	6,490	255,846	769,155
1906.....	628,152	141,854	213,867	983,873
1907.....	672,561	123,972	167,074	963,607
1908.....	713,772	59,532	200,033	973,337
1909.....	697,068	241,207	171,722	1,109,997
1910.....	808,762	247,336	203,528	1,259,626
1911.....	737,261	207,193	237,009	1,181,463
1912.....	956,458	191,779	183,673	1,331,910
1913.....	1,048,433	229,402	328,086	1,605,921
1914.....	417,409	43,513	172,998	633,920
1915.....	802,128		66,323	868,451
Total.....	9,726,881	2,078,197	3,720,558	15,525,636

IRON ORE PRICES

The prices of Canadian iron ores are naturally based on prices current in the United States. "Lake ores," that is, those originating in what is generally known as the Lake Superior iron region, and which contribute about 80 per cent of the iron and steel requirements of the United States are, by agreement amongst the principal operators, quoted per gross ton delivered at Lake Erie ports. Ore prices and freights are usually fixed at the beginning of each season and the price of any individual ore then depends on its variation from the standard in iron and phosphorus content, etc.

The urgent demand for iron ore by United States blast furnaces during the later months of 1915 resulted in general buying for 1916 delivery early

in December, and the fixing of prices for the coming season at 75 cents in advance of the 1914 and 1915 quotations, which have been as follows:—

Iron Ore Prices per Gross ton.

	1914 and 1915	1916
Old Range Bessemer.....	\$3.75	\$4.50
Mesabi Bessemer	3.50	4.20
Old Range Non-Bessemer.....	3.00	3.75
Mesabi Non-Bessemer	2.85	3.55

The base for Bessemer ores is 55% iron natural, and .045% phosphorus dried at 212° F.

The base for Non-Bessemer ores is 51.5% iron natural.

Since 1900 the price for Old Range Bessemer ores has ranged between a minimum of \$3.00 in 1904 and a maximum of \$6.48 in 1900—Non-Bessemer ores being generally from 50 to 80 cents lower.

Ore prices in eastern United States are generally quoted at a rate per unit delivered eastern Pennsylvania points on tidewater. Thus in 1914 and 1915, Newfoundland, Nova Scotia, and New Brunswick ores sold in this market, would bring from 6 to 8 cents per unit, or per cent of iron. The 1916 prices range from 8 to 8½ cents per unit for 50% to 65% ore.

The following record published by the "Iron Trade Review," of Cleveland, O., shows the annual selling price of "Lake iron ore," and the price of pig-iron at the date of buying movement.

Selling Price of Iron Ore and Price of Pig-Iron at Date of Buying Movement.*

(PER GROSS TON.)

Season.	Date buying movement.	Season Iron Ore Prices.				Iron Prices Valley.	
		Old range Bessemer.	Mesabi Bessemer.	Old range Non-Bessemer.	Mesabi Non-Bessemer.	Bessemer.	Foundry Iron No. 2.
1890...	Dec. 15, 1889..	\$ 5.50	no sale	\$5.25	no sale	\$22.15	\$18.15
1891...	June 1, 1891..	4.50	"	4.25	"	15.15	15.00
1892...	Jan. 31, 1892..	4.50	"	3.65	"	15.00	13.65
1893...	Mar. 15, 1893..	3.85	\$3.00	3.20	"	12.65	12.15
1894...	Mar. 1, 1894..	2.75	2.35	2.50	"	9.65	9.65
1895...	Apl. 1, 1895..	2.90	2.19	2.25	\$1.95	9.40	9.40
1896...	May 1, 1896..	4.00	3.50	2.70	2.25	12.40	11.15
1897...	" 20, 1897..	2.60	2.25	2.15	1.90	8.35	8.40
1898...	Mar. 20, 1898..	2.75	2.25	1.85	1.75	9.55	9.80
1899...	Feb. 1, 1899..	3.00	2.40	2.15	2.00	10.30	9.75
1900...	Dec. 15, 1899..	5.50	4.50	4.25	4.00	24.15	22.15
1901...	Apl. 15, 1901..	4.25	3.25	3.00	2.75	16.15	14.40
1902...	Feb. 1, 1902..	4.25	3.25	3.25	2.75	15.90	15.90
1903...	Mar. 20, 1903..	4.50	4.00	3.60	3.20	21.50	21.65
1904...	Apl. 15, 1904..	3.25	3.00	2.75	2.50	13.35	13.15
1905...	Feb. 1, 1905..	3.75	3.50	3.20	3.00	15.50	16.00
1906...	Dec. 5, 1905..	4.25	4.00	3.70	3.50	17.25	17.25
1907...	Nov. 5, 1906..	5.00	4.75	4.20	4.00	21.50	21.50
1908...	June 15, 1908..	4.50	4.25	3.70	3.50	16.00	15.00
1909...	May 10, 1909..	4.50	4.25	3.70	3.50	14.75	14.25
1910...	Dec. 24, 1909..	5.00	4.75	4.20	4.00	19.00	17.25
1911...	Apl. 21, 1911..	4.50	4.25	3.70	3.50	15.00	13.75
1912...	Mar. 20, 1912..	3.75	3.50	3.00	2.85	14.25	13.25
1913...	Nov. 19, 1912..	4.40	4.15	3.60	3.40	17.25	17.50
1914...	May 1, 1914..	3.75	3.45	3.00	2.80	14.00	13.25
1915...	Apl. 19, 1915..	3.75	3.50	3.00	2.85	13.60	12.75
1916...	Dec. 7, 1915..	4.45	4.20	3.70	3.55	18.50	18.00
1917...	Nov. 22, 1916..	5.95	5.70	5.20	5.05	30.00	26.00

* Iron Trade Review, November 30, 1916, p. 1108.

LAKE FREIGHT RATES

The lake freight rates on iron ore from upper lake ports to Lake Erie ports were in 1914 from Escanaba, Mich., 35 cents; from Marquette 45 cents; and from the head of Lake Superior 50 cents. The rates in 1915 were 10 cents per ton lower, or from Escanaba 25 cents; from Marquette 35 cents; and from the head of Lake Superior 40 cents. The rates in 1916 have been increased again to those governing in 1914.

The Marquette rate which covers shipments from Michipicoten has fallen from 94 cents in 1900 to a minimum of 35 cents in 1915.

Shipments from Key Harbour (Moose Mountain ore), have been at the Escanaba rate, or 10 cents lower than Michipicoten.

The above rates are quoted net, there is an additional unloading charge of 10 cents per ton.

IRON ORE PRODUCTION IN THE UNITED STATES

Canada's imports of iron ore from the United States have already been noted. It may be of interest to state that the total production of iron ore in the United States in 1915 was 55,526,490 gross tons, compared with 41,439,761 gross tons in 1914, and 61,980,437 gross tons in 1913, and that

during the past twenty years the Lake Superior district has supplied from 80 to 85 per cent of the total United States production.

PIG-IRON

The total production of pig-iron in 1915 not including the output of ferro-alloys, which is separately tabulated, was 913,775 short tons (815,870 long tons) valued at \$11,374,199, as compared with 783,164 short tons (699,256 long tons), valued at \$10,002,856 in 1914, and 1,128,967 short tons (1,008,006 long tons), valued at \$16,540,012 in 1913. An increase of 16.67 per cent is shown in the production of pig-iron in 1915, as compared with a decrease of over 30 per cent in 1914.

The production in Nova Scotia in 1915 was 420,275 tons, as against 227,052 tons in 1914, an increase of 193,223 tons, or 85 per cent, while the production in Ontario was 493,500 tons in 1915, compared with 556,112 tons in 1914, a decrease of 62,612 tons, or 11 per cent.

Of the total output of pig-iron in 1915, 13,692 tons were made with charcoal as fuel and 900,083 tons with coke. The amount of charcoal pig-iron made in 1914, was 9,380 tons, as against 23,696 tons in 1913 and 21,701 tons in 1912. The quantity made with coke as fuel in 1914 was 773,784 tons, as against 1,105,271 tons in 1913, and 992,886 tons in 1912.

By grades the 1915 production included: Basic 739,613 tons, Bessemer 29,052 tons, Foundry and Malleable, etc., 145,110 tons. The 1914 production included: Basic 346,553 tons, Bessemer 230,817; Foundry and Malleable, etc., 205,794 tons.

The annual production of pig-iron by provinces and by grades is shown in the following tables. The values placed upon the Nova Scotia production are assumed, the greater part of the production being used in the steel plants.

There has been no production of pig-iron in the Province of Quebec during the past four years. Formerly this Province had a continuous though small production of charcoal iron which commanded a high price. The three small furnaces at Radnor Forges and Drummondville, at which this production was made are now reported as abandoned.

Annual Production of Pig-Iron by Provinces, 1887-1915.

Year.	NOVA SCOTIA.		ONTARIO.		QUEBEC.		TOTAL.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
1887.....	19,320	\$ 250,000	.....	.....	5,507	\$116,192	24,827	\$ 366,192
1888.....	17,556	211,403	.....	.....	4,243	101,832	21,799	313,235
1889.....	21,289	383,202	.....	.....	4,632	116,670	25,921	499,872
1890.....	18,382	262,608	.....	.....	3,390	69,080	21,772	331,688
1891.....	20,840	297,728	.....	.....	3,051	71,173	23,891	368,901
1892.....	34,393	458,556	.....	.....	8,050	178,865	42,443	637,421
1893.....	46,472	553,408	.....	.....	9,475	236,875	55,947	790,283
1894.....	41,344	449,533	.....	.....	8,623	196,914	49,967	646,447
1895.....	35,192	417,083	.....	.....	7,262	169,653	42,454	586,736
1896.....	32,351	400,829	28,302	\$368,942	6,615	154,358	67,268	924,129
1897.....	22,500	230,000	26,115	291,466	9,392	217,235	58,007	738,701
1898.....	21,627	221,677	48,253	530,789	7,135	159,929	77,015	912,395
1899.....	31,100	404,300	64,749	808,157	7,094	164,849	102,943	1,377,306
1900.....	28,133	421,995	62,387	938,725	6,055	140,978	96,575	1,501,698
1901.....	151,130	1,764,017	116,371	1,599,413	6,875	149,493	274,376	3,512,923
1902.....	237,244	2,477,767	112,683	1,584,273	7,970	181,501	357,902	4,243,541
1903.....	201,246	2,186,273	87,004	1,345,464	9,635	210,973	297,885	3,742,710
1904.....	164,488	1,700,130	127,845	1,746,126	11,121	241,729	303,454	3,687,985
1905.....	261,014	2,440,722	256,704	3,868,197	7,588	166,267	525,306	6,475,186
1906.....	315,008	3,439,217	275,558	4,338,275	7,845	177,644	598,411	7,955,136
1907.....	366,456	4,211,913	275,459	4,581,309	10,047	232,004	651,962	9,125,226
1908.....	352,642	3,554,540	271,484	4,385,271	6,709	171,383	630,835	8,111,194
1909.....	345,380	3,453,800	407,012	6,002,441	4,770	125,623	757,162	9,581,864
1910.....	350,287	4,203,444	447,273	6,956,923	3,237	85,255	800,797	11,245,622
1911.....	390,242	4,682,904	526,635	7,606,939	658	17,282	917,535	12,307,125
1912.....	424,994	6,374,910	589,593	8,176,089	.....	.....	1,014,587	14,550,999
1913.....	480,068	7,201,020	648,899	9,338,992	.....	.....	1,128,967	16,540,012
1914.....	227,052	2,951,676	556,112	7,051,180	.....	.....	783,164	10,002,856
1915.....	420,275	5,463,575	493,500	5,910,624	.....	.....	913,775	11,374,199

Annual Production of Pig-Iron by Grades, and by Fuels.

IN SHORT TONS.

Year.	BY GRADES.			BY FUELS.	
	Basic.	Bessemer.	Foundry and all other.	Charcoal.	Coke.
1909.....	400,921	222,931	133,310	17,003	740,159
1910.....	425,400	219,492	155,905	17,164	783,633
1911.....	464,221	208,626	244,688	20,759	896,776
1912.....	544,534	256,191	213,862	21,701	992,886
1913.....	614,845	265,685	248,437	23,696	1,105,271
1914.....	346,553	230,817	205,794	9,380	783,784
1915.....	739,613	29,052	145,110	13,692	900,083

Monthly Prices of Foundry Pig-Iron at Montreal.*

	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
January.....	\$17.50	\$20.25	\$21.00	\$18.00	\$18.50	\$21.00	\$19.75	\$22.00	\$19.75	\$19.35
February.....	18.00	20.50	21.00	18.00	18.50	21.00	19.00	22.00	19.75	19.35
March.....	19.00	20.50	22.00	18.00	18.50	21.00	19.00	22.00	19.75	20.10
April.....	18.75	21.50	20.00	18.00	19.00	21.00	18.50	22.00	19.75	19.90
May.....	18.00	21.50	19.00	18.75	19.00	19.25	18.50	22.00	19.75	19.90
June.....	18.00	21.50	18.75	18.75	18.50	19.25	18.50	21.50	19.75	19.90
July.....	18.00	21.50	18.75	18.50	18.50	19.25	18.50	21.50	19.50	19.90
August.....	18.50	21.75	18.00	18.50	18.00	19.25	19.00	20.50	19.50	19.90
September.....	18.75	21.75	18.00	18.50	18.00	19.25	20.00	20.50	19.50	20.00
October.....	18.75	21.50	17.75	19.00	21.00	19.25	20.50	20.50	19.50	20.00
November.....	19.00	21.00	18.00	19.00	21.00	19.25	20.50	19.75	19.40	21.00
December.....	19.25	20.50	18.25	19.00	21.00	19.25	21.50	19.75	19.40	22.00
Average.....	18.46	21.15	19.21	18.50	19.13	19.83	19.44	21.17	19.61	20.10

* No. 1 Foundry Pig-Iron, f.o.b. cars Montreal, price per ton of 2,240 pounds on the opening market-day of each month. Quotation furnished by The Dominion Iron & Steel Co., Ltd.

Average Monthly Price of Bessemer Pig-Iron at Pittsburgh.*

PER GROSS TON (2240 POUNDS).

	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
January.....	\$18.35	\$23.15	\$19.00	\$17.34	\$19.90	\$15.90	\$15.05	\$18.15	\$14.96	\$14.70
February.....	18.35	22.85	17.90	16.78	19.34	15.90	15.90	18.15	15.09	14.63
March.....	18.28	22.85	17.86	16.25	18.60	15.90	15.09	18.15	15.09	14.55
April.....	18.19	23.35	17.49	15.78	18.27	15.90	15.15	17.90	14.90	14.55
May.....	18.10	24.01	16.93	15.84	17.52	15.90	15.13	17.70	14.90	14.55
June.....	18.23	24.27	16.90	16.05	16.60	15.90	15.15	17.14	14.90	14.58
July.....	18.41	23.55	16.83	16.46	16.40	15.90	15.20	16.70	14.90	14.88
August.....	19.00	22.90	16.23	17.03	16.09	15.90	15.46	16.52	14.90	15.89
September.....	19.54	22.90	15.90	18.05	15.90	15.90	16.15	16.65	14.90	16.80
October.....	20.35	22.00	15.71	19.53	15.90	15.44	17.80	16.60	14.84	16.95
November.....	22.85	20.65	16.59	19.90	15.82	15.00	18.02	16.02	14.59	17.45
December.....	23.75	19.34	17.40	19.90	15.90	15.03	18.15	15.77	14.70	19.50

* From the *Iron Age*.

Average Monthly Price of Grey Forge Pig-Iron at Pittsburgh.*

PER GROSS TON (2240 POUNDS).

	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
January.....	\$17.30	\$22.58	\$17.00	\$15.40	\$17.40	\$14.09	\$13.40	\$17.15	\$13.65	\$13.45
February.....	17.29	22.20	15.99	15.09	17.02	14.27	13.40	17.15	13.65	13.45
March.....	16.91	21.76	15.90	14.65	16.15	14.40	13.40	16.92	13.65	13.45
April.....	16.66	21.72	15.45	14.40	16.09	14.40	13.65	16.17	13.65	13.40
May.....	16.49	22.88	14.90	14.40	15.90	14.27	13.78	15.17	13.65	13.20
June.....	16.35	23.15	14.90	14.77	15.20	14.00	13.90	14.71	13.65	13.20
July.....	16.41	22.96	14.90	14.85	14.52	13.90	13.90	14.55	13.65	13.20
August.....	17.75	21.90	14.71	15.21	14.30	13.90	14.15	14.25	13.65	14.20
September.....	18.35	21.15	14.46	16.15	14.15	13.84	14.65	14.25	13.65	14.95
October.....	19.47	20.40	14.40	17.02	14.15	13.65	16.18	14.26	13.58	15.07
November.....	22.45	19.17	14.90	17.27	14.09	13.47	16.50	14.25	13.45	15.88
December.....	22.85	18.40	15.25	17.40	13.90	13.40	17.15	13.95	13.40	18.15

* From the *Iron Age*.

Previous to 1896 pig-iron was made entirely from Canadian ores. Since that date, however, increasing quantities of imported ore have been used as well as imported fuels and fluxes, and in 1915 about 83 per cent of the ore charged, 46 per cent of the coke, and a large proportion of the limestone were imported. The iron industry at Sydney and North Sydney has been built up on the basis of the Newfoundland Wabana ores and the local coal supply, while in recent years a portion of the limestone required has also been obtained from Port au Port, Newfoundland. In Ontario large quantities of United States "Lake ores" are used, the imported ores charged being 623,094 tons, and Canadian ores 293,305 tons, in 1915. All the fuel used, with the exception of a small quantity of charcoal, was imported either as coke, or as coal, for charging the by-product coke ovens at Sault Ste. Marie. A portion of the limestone flux is also obtained from quarries situated in the United States.

Iron Ore, Fuel, and Flux charged to Blast Furnaces.

Calendar Year.	IRON ORE CHARGED.		FUEL CHARGED.			Limestone.
	Canadian.	Imported.	Charcoal.	*Coke from Canadian coal.	Coke imported or made from imported coal.	
	Short tons.		Bushels.	Short tons.	Short tons.	Short tons.
1887	60,434		940,400	33,581		17,171
1888	54,956		804,286	30,228		16,857
1889	65,670		755,800	36,333		22,122
1890	57,304		589,860	34,073		18,478
1891	60,933		441,812	32,796		11,377
1892	96,948		1,121,365	52,622		22,967
1893	124,053		1,302,720	65,332		27,797
1894	108,871		1,173,970	60,026		35,101
1895	93,208		789,561	51,629		31,585
1896	96,560	46,300	756,600	50,067	33,990	37,462
1897	53,658	55,722	1,031,800	35,800	27,810	31,273
1898	57,881	77,107	836,400	31,952	50,407	33,913
1899	66,384	120,650	1,928,025	44,844	64,648	51,826
1900	71,341	112,042	1,799,737	45,021	59,345	52,966
1901	156,613	361,010	1,835,736	207,835	115,367	169,399
1902	125,664	559,381	2,146,623	362,208	112,314	293,594
1903	82,035	485,911	2,322,030	350,190	96,540	277,452
1904	180,932	454,671	3,477,470	257,182	130,210	211,278
1905	116,974	861,847	4,404,394	365,897	243,882	369,715
1906	221,733	982,740	2,168,476	462,672	304,676	456,036
1907	244,104	1,117,260	1,682,085	521,068	327,082	488,462
1908	209,266	1,051,445	1,121,990	492,076	325,670	483,065
1909	231,994	1,235,000	1,779,258	412,016	507,255	526,076
1910	149,505	1,377,035	1,615,919	491,281	476,838	569,355
1911	67,434	1,628,368	1,960,459	543,933	577,388	625,216
1912	71,588	2,019,165	1,886,748	609,183	656,815	705,613
1913	139,436	2,110,828	2,206,191	710,260	706,888	630,119
1914	182,964	1,324,326	920,045	330,269	590,902	447,641
1915	293,305	1,463,488	1,314,957	578,743	486,022	573,743

* Includes for the first ten years small quantity of coal.

IRON BLAST FURNACES IN CANADA IN 1915

Of 22 completed furnaces, 13 were in blast in 1915 for varying periods of time. The total daily capacity of the 22 furnaces is about 4,780 tons. The operating companies, with numbers and capacities of furnaces were as follows:—

Dominion Iron & Steel Co., Sydney, C.B.—Six completed furnaces of 280 tons capacity each per day; two operated throughout 1915; one for 36 days, one for 179 days and one for 348 days; one furnace idle throughout the year.

Nova Scotia Steel & Coal Co., Ltd., New Glasgow, N.S.—One furnace at Sydney Mines, C.B., of 200 tons capacity; operated throughout 1915.

Londonderry Iron & Mining Co., Ltd., Londonderry, N.S.—One furnace of 100 tons capacity; idle throughout the year.

Canada Iron Foundries, Ltd., Montreal, Que.—Two small furnaces of seven and eight tons capacity, at Drummondville, Que. (abandoned); one furnace of 24 tons daily capacity, at Radnor Forges, Que. (abandoned); two furnaces of 125 tons and 250 tons at Midland, Ont.: all idle throughout the year.

Standard Iron Co. of Canada, Ltd., Deseronto, Ont.—One furnace at Deseronto with a daily capacity of 65 tons, operated for 235 days during the year 1915; one furnace of 65 tons at Parry Sound, idle throughout the year.

The Steel Co. of Canada, Ltd., Hamilton, Ont.—Two furnaces, one of 260 tons capacity, operated for 52 days in 1915; a second furnace of 430 tons capacity, operated throughout the year.

Algoma Steel Co., Ltd., Sault Ste. Marie, Ont.—Three furnaces at Steelton, near Sault Ste. Marie, two of 280 tons capacity each, and one of 500 tons capacity, operated throughout the year.

The Atikokan Iron Co., Ltd., Port Arthur, Ont.—One furnace of 175 tons capacity, idle throughout the year.

The Canadian Furnace Co., Ltd., Port Colborne, Ont.—One furnace of 325 tons capacity, operated 262 days in 1915.

EXPORTS AND IMPORTS OF PIG-IRON

The total exports of pig-iron and ferro-alloys during 1915 were 26,545 tons, and included 17,307 tons of pig-iron valued at \$231,551, or an average of \$13.38 per ton, and 9,238 tons of ferro-alloys valued at \$537,081, or an average of \$58.14 per ton.

The exports between 1905 and 1913 did not exceed 10,000 tons in any one year, and consisted largely, if not entirely, of ferro-alloys. During 1914, however, there was a small export of pig-iron chiefly from Sydney to Philadelphia. The exports during the first three months of the year were 4,431 tons, which probably included about 4,000 tons of pig-iron. From

the first of April the exports were separately classified and during the last nine months of the year included 9,767 tons of pig-iron valued at \$118,111, or an average of \$12.09 per ton, and 4,865 tons of ferro-alloys valued at \$285,221, or an average of \$58.63 per ton.

Considerable quantities of pig-iron are annually imported into Canada. During the calendar year 1915, the total imports of pig-iron excluding ferro-products which are separately stated, were 47,482 tons, valued at \$624,200, and included 46,894 tons, valued at \$615,268, or an average of \$13.12 per ton from the United States, and 588 tons valued at \$8,932, or an average of \$15.19 per ton from Great Britain.

During the calendar year 1914 the total imports of pig-iron were 78,680 tons, valued at \$982,189, and included 69,254 tons valued at \$862,598, or an average of \$12.46 per ton, from the United States; and 9,426 tons, valued at \$119,591, or an average of \$12.68 per ton, from Great Britain.

Annual Exports of Pig-Iron and Ferro-alloys, 1896-1915.

Calendar Year.	Tons.	Value.	Average value.	Calendar Year.	Tons.	Value.	Average value.
1896.....	2,187	\$55,448	\$25.35	1905.....	866	\$22,284	\$25.73
1897.....	3,099	81,381	26.26	1906.....	305	7,429	24.36
1898.....	1,278	32,645	25.54	1907.....	439	13,504	30.76
1899.....	6,981	149,190	21.37	1908.....	290	10,614	36.60
1900.....	3,513	88,052	25.06	1909.....	5,063	186,778	36.89
1901.....	57,650	593,739	10.30	1910.....	9,763	296,310	30.35
1902.....	75,195	778,619	10.35	1911.....	5,870	271,968	46.33
1903.....	4,400	78,382	17.81	1912.....	6,976	310,702	44.54
1904.....	21,016	200,363	9.53	1913.....	6,326	351,646	55.59
				1914.....	19,063	486,366	25.51

Calendar Year.	PIG-IRON.			FERRO-ALLOYS.		
	Short tons.	Value.	Average value.	Short tons.	Value.	Average value.
1915.....	17,307	\$231,551	\$13.38	9,238	\$537,081	\$58.14

Annual Imports of Pig-Iron showing Country of Origin.

	UNITED STATES.			GREAT BRITAIN.			OTHER COUNTRIES.		
	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.	Short tons.	Value.	Value per ton.
1908.....	26,434	\$ 448,794	\$16.98	30,574	\$ 414,116	\$13.54	335	\$8,705	\$25.99
1909.....	50,167	735,138	14.65	87,394	1,055,799	12.08	364	7,255	19.93
1910.....	107,984	1,516,685	14.05	119,678	1,603,951	13.40	91	2,059	22.63
1911.....	122,360	1,552,896	12.69	86,125	1,058,078	12.29	2	15	7.50
1912.....	210,756	2,599,117	12.33	61,809	912,482	14.76	.....	.....	.....
1913.....	213,969	2,888,974	13.50	22,800	358,431	15.72	.....	.....	.....
1914.....	69,254	862,598	12.46	9,426	119,591	12.68	.....	.....	.....
1915.....	46,894	615,268	13.12	588	8,932	15.19	.....	.....	.....

Annual Imports of Pig-Iron since 1880.

Year.	PIG-IRON.			CHARCOAL PIG-IRON.			TOTAL.	
	Short tons.	Value.	Average value.	Short tons.	Value.	Average value.	Short tons.	Value.
1880(c).....	(a) 23,159	\$371,956	\$16.06	.....	.....	.....	23,159	\$371,956
1881.....	(a) 43,630	715,997	16.41	.....	.....	.....	43,630	715,997
1882.....	56,594	811,221	14.33	6,837	\$211,791	\$30.98	63,431	1,023,012
1883.....	75,295	1,085,755	14.42	2,198	58,994	26.84	77,493	1,144,749
1884.....	49,291	653,708	13.26	2,893	66,602	23.02	52,184	723,010
1885.....	42,279	545,425	12.90	1,119	27,333	24.43	43,398	572,759
1886.....	42,463	528,483	12.45	3,185	60,086	18.87	45,648	588,569
1887.....	46,295	554,388	11.98	3,919	77,420	19.76	50,214	631,808
1888.....	(b) 48,973	648,012	13.23	.....	.....	.....	48,973	648,012
1889.....	(b) 72,115	864,752	11.99	.....	.....	.....	72,115	864,752
1890.....	(b) 87,613	1,148,078	13.10	.....	.....	.....	87,613	1,148,078
1891.....	(b) 81,317	1,085,929	13.35	.....	.....	.....	18,317	1,085,929
1892.....	(b) 68,918	886,485	12.86	.....	.....	.....	68,918	886,485
1893.....	56,849	682,209	12.00	5,944	84,359	14.19	62,793	766,567
1894.....	42,376	483,787	11.42	2,906	34,968	12.03	45,282	518,755
1895.....	31,637	341,259	10.80	2,780	31,171	11.21	34,417	372,430
1896.....	36,131	394,591	10.92	917	11,726	12.79	37,048	406,317
1897.....	25,766	291,788	11.32	2,936	35,373	12.05	28,702	327,161
1898.....	37,186	382,103	10.28	2,250	23,533	10.46	39,436	405,636
1899.....	44,261	452,911	10.23	1,955	19,123	9.78	46,216	472,034
1900.....	49,767	811,490	16.31	1,816	38,736	21.33	51,583	850,226
1901.....	35,293	548,033	15.53	490	7,121	14.53	35,783	555,154
1902.....	39,978	585,077	14.64	38	726	19.11	40,016	585,803
1903.....	91,730	1,338,574	14.59	882	16,352	18.54	92,612	1,354,926
1904.....	62,515	894,728	14.31	.....	.....	.....	62,515	894,728
1905.....	71,005	857,879	12.08	.....	.....	.....	71,005	857,879
1906(c).....	96,797	1,401,047	14.47	.....	.....	.....	96,797	1,401,047
1907(d).....	249,582	4,117,887	16.50	2,062	41,806	20.27	251,644	4,159,693
1908.....	57,343	871,615	15.20	1,022	18,818	18.41	58,365	890,433
1909.....	137,925	1,798,192	13.04	413	5,727	13.87	138,338	1,803,919
1910.....	227,753	3,122,695	13.71	16,106	242,152	15.03	243,859	3,364,847
1911.....	208,487	2,610,989	12.52	.....	.....	.....	208,487	2,610,989
1912.....	272,565	3,511,599	12.88	115	1,370	11.91	272,680	3,512,969
1913.....	235,843	3,234,877	13.72	926	12,528	13.53	236,769	3,247,405
1914.....	78,594	981,107	12.48	86	1,082	12.58	78,680	982,189
1915(d).....	47,482	624,200	13.15	.....	.....	.....	47,482	624,200

(a) Comprises pig-iron of all kinds.

(b) These figures appear in Customs reports under heading "iron in pigs, iron kentledge, and cast iron."

(c) Year ending June 30 from 1880 to 1906 inclusive.

(d) Calendar year from 1907 to date.

FERRO-PRODUCTS

Ferro-silicon and ferro-phosphorus were produced in Canada in electric smelting plants during 1915, the latter in small quantities only. Ferro-silicon, 50 per cent, 75 per cent, and 85 per cent, was made at Welland, Ont., by the Electro-Metals, Ltd., and ferro-phosphorus at Buckingham, Que., by the Electric Reduction Co., Ltd.

The total production of ferro-alloys during 1915, was 10,794 tons, valued at \$753,404, as against a production of 7,524 tons, valued at \$478,355 in 1914, and 8,075 tons, valued at \$493,018 in 1913. In 1912 the production was 7,834 short tons, valued at \$465,225, and in 1911, 7,507 short tons valued at \$376,404.

The exports of ferro-products were formerly included with pig-iron, but have been separately tabulated since April 1, 1914. During the nine months ending December, 1914, the exports of ferro-silicon and other ferro-products, as already stated, were 4,865 tons, valued at \$285,221, and during the twelve months ending December, 1915, 9,238 tons valued at \$537,081.

The imports of ferro-silicon, ferro-manganese, etc., during the calendar year 1915, were 13,758 tons, valued at \$807,312, or an average of \$58.68 per ton, as compared with imports during the calendar year 1914 of 22,147 tons, valued at \$549,485, or an average of \$24.81 per ton.

Imports of Ferro-Manganese, Ferro-Silicon, etc.

Fiscal Year.	Short tons.	Value.	Average value.	Fiscal Year.	Short tons.	Value.	Average value.
*1887.....	123	\$1,435	\$11.67	1903.....	6,350	\$162,710	\$25.62
1888.....	1,883	29,812	15.83	1904.....	2,975	75,554	25.40
1889.....	5,868	72,108	12.29	1905.....	12,935	246,815	19.08
1890.....	696	18,895	27.15	1906.....	15,023	462,739	30.80
1891.....	2,707	40,711	15.04	Calendar Year.			
1892.....	1,311	23,930	18.25	1907.....	15,437	536,285	34.74
1893.....	529	15,858	29.98	1908.....	11,718	401,761	34.29
*1894.....	284	9,885	34.81	1909.....	17,699	411,536	23.25
†1895.....	164	5,408	32.98	1910.....	18,900	464,741	24.59
1896.....	652	12,811	19.65	1911.....	17,226	429,465	24.93
1897.....	426	9,233	21.67	1912.....	19,810	469,884	23.72
1898.....	1,418	22,516	15.88	1913.....	30,355	990,443	30.98
1899.....	1,160	22,539	19.43	1914.....	22,147	549,485	24.81
1900.....	1,149	39,064	34.00	†1915.....	13,758	807,312	58.68
1901.....	1,512	38,954	25.76				
1902.....	6,513	150,977	23.18				

* From 1887 to 1894 inclusive, these amounts include: ferro-manganese, ferro-silicon, spiegel, steel bloom ends and crop ends of steel rails, for the manufacture of iron and steel.

† From 1895 to date, ferro-silicon, spiegeleisen, and ferro-manganese.

CONSUMPTION OF PIG-IRON AND FERRO-ALLOYS

The total quantity of pig-iron and ferro-alloys used in Canada arrived at by adding to the production, the excess of imports over exports amounted

in 1915 to 959,254 tons. Of this amount 762,055 tons were used in steel furnaces, leaving 197,199 tons for foundry and other uses.

The greatest consumption was reached in 1913, with 1,397,840 tons of which 943,130 tons were used in steel furnaces and 454,710 tons available for other uses.

Consumption of Pig-Iron and Ferro-alloys.

Year.	Used in steel furnaces.		Available for foundry and other uses.	Total consumption.* Short tons.
	Pig-iron.	Ferro-alloys.		
1910.....	690,913	8,143	361,914	1,060,970
1911.....	700,679	21,359	422,847	1,144,885
1912.....	735,559	24,237	548,024	1,307,820
1913.....	913,722	29,408	454,710	1,397,840
1914.....	619,030	20,252	233,170	872,452
1915.....	748,114	13,941	197,199	959,254

* Production of pig-iron and ferro-alloys plus excess of imports over exports.

WORLD'S PRODUCTION OF PIG-IRON

The United States is the largest producer of pig-iron, Germany the second largest, and Great Britain third. Canada's output was between one and two per cent only of the total which in 1915 amounted to nearly 63,500,000 gross tons.

The production in principal countries is shown in the following table:—

World's Production of Pig-Iron.

(IN LONG TONS.)

	1850*	1890*	1900*	1910*	1914	1915
United States.....	563,755	9,202,703	13,789,242	27,303,567	23,332,244	29,916,213
Germany.....	350,000	4,584,882	8,381,373	14,559,509	14,163,000	11,680,000
Great Britain.....	2,300,000	7,904,214	8,959,691	10,012,093	9,005,898	8,793,659
France.....	405,653	1,931,188	2,669,966	3,974,478	4,946,000	4,675,000
Russia.....	227,555	912,561	2,839,789	2,992,058	4,194,000	3,638,000
Austria-Hungary.....	250,000	910,685	1,472,695	2,153,785	1,988,000	1,929,000
Belgium.....	144,452	775,385	1,001,872	1,822,821	1,535,000	.....
Canada.....	.....	19,439	86,090	740,210	699,256	815,870
Sweden.....	150,000	483,155	518,263	594,385	625,000	758,000
Spain.....	.....	176,598	289,315	367,423	428,000	412,000
Italy.....	.....	14,094	23,569	347,657	379,000	389,000
Other countries.....	10,000	80,000	100,000	400,000	487,000	472,000
	4,401,415	26,994,904	40,181,865	65,268,994	61,782,398	63,478,742

* From "Metal Statistics," 1916, published by The American Metal Market Co.

STEEL

The production of steel ingots and castings in 1915 was 1,020,896 tons, as compared with 828,641 tons in 1914, and 1,168,993 tons in 1913. Compared with the previous year there was an increase in total production in 1915 amounting to 184,285 tons, or 22 per cent. The 1915 production included: open-hearth ingots 962,411 tons; Bessemer ingots 19,448 tons; electric steel and other ingots 7,970 tons; direct open-hearth castings 28,384 tons; other steel castings 2,683 tons. The total production of steel in electric furnaces was 5,625 tons. The 1914 production included: open-hearth ingots 608,383 tons; Bessemer ingots 203,184 tons; direct open-hearth castings 15,315 tons; other steel castings 1,759 tons. The production of steel in electric furnaces reported was 61 tons.

Statistics of the production of steel ingots and castings since 1894 are given in the following table, the figures for 1894 to 1906 inclusive having been collected and published by the American Iron and Steel Association; those for the years 1907 to 1915 have been collected by this Department.

Annual Production of Steel Ingots and Castings.

(IN SHORT TONS.)

Year.	STEEL INGOTS.				STEEL CASTINGS.			Total ingots and castings.
	Open-hearth.	Bessemer.	Electric and converter	Total ingots.	Open-hearth.	Other steels.	Total castings.	
1894	.....	.....	.....	.....	.....	.....	.....	28,767
1895	.....	.....	.....	.....	.....	.....	.....	19,040
1896	.....	.....	.....	.....	.....	.....	.....	17,920
1897	.....	.....	.....	.....	.....	.....	.....	20,608
1898	.....	.....	.....	.....	.....	.....	.....	24,125
1899	.....	.....	.....	.....	.....	.....	.....	24,640
1900	.....	.....	.....	.....	.....	.....	.....	26,406
1901	.....	.....	.....	.....	.....	.....	.....	29,214
1902	.....	.....	.....	197,959	.....	.....	5,922	203,881
1903	.....	.....	.....	198,249	.....	.....	5,047	203,296
1904	.....	.....	.....	159,352	.....	.....	7,286	166,638
1905	.....	.....	.....	441,342	.....	.....	10,521	451,863
1906	.....	.....	.....	622,623	.....	.....	16,773	639,396
1907	459,240	225,989	.....	685,229	20,602	1,151	21,753	706,982
1908	443,442	135,557	.....	578,999	9,051	713	9,764	588,763
1909	535,988	203,715	.....	739,703	14,013	1,003	15,016	754,719
1910	580,932	222,668	.....	803,600	18,085	599	18,684	822,284
1911	651,676	209,817	.....	861,493	20,163	740	20,903	882,396
1912	692,236	231,044	.....	923,280	31,845	2,556	34,401	957,681
1913	824,818	301,932	.....	1,126,750	39,217	3,026	42,243	1,168,993
1914	608,383	203,184	.....	811,567	15,315	1,759	17,074	828,641
1915	962,411	19,448	7,970	989,829	28,384	2,683	31,067	1,020,896

Materials Charged to Steel Furnaces.—The total quantity of pig-iron used in steel furnaces during 1915 was 748,114 tons, of which 724,735 tons were produced by the firms reporting and 23,379 tons purchased. The quantity of ferro-alloys used was 13,941 tons purchased. Scrap was used to the extent of 413,266 tons. Ores used included 908 tons of mangan-

ese, and 74,872 tons of iron ore, while 252,045 tons of limestone and dolomite were used, and 13,520 tons of fluorspar. In Ontario about 823 million cu. ft., of natural gas were used, while in Nova Scotia coke oven gas was used at Sydney, of which a record of quantity was not obtained.

A record of materials used in steel furnaces covering the past six years is shown in the following table:—

Pig-Iron, Scrap Iron, and Other Materials Charged to Steel Furnaces.

(IN SHORT TONS.)

Year.	Pig-Iron.	Ferro-alloys.	Scrap iron.	Iron ore.	Manganese ore.	Fluorspar.	Limestone and dolomite.
1910.....	690,913	8,143	211,453	39,332	1,317	7,461	144,110
1911.....	700,769	21,359	278,797	42,892	829	8,067	130,270
1912.....	735,559	24,237	336,265	43,006	985	9,709	148,045
1913.....	913,722	29,408	406,403	55,018	1,342	10,687	197,028
1914.....	619,030	20,252	286,863	37,686	723	7,845	114,859
1915.....	748,114	13,941	413,266	74,872	908	13,520	252,045

It will be noted that there is a large consumption of scrap iron and steel in the manufacture of steel ingots and castings. Trade records show a considerable import and export of these materials as illustrated in the accompanying tables.

The exports of scrap iron and steel in 1915, are reported as 89,358 tons, valued at \$883,134, or an average of \$9.88 per ton, as against exports in 1914 of 35,405 tons, valued at \$446,337, or an average of \$12.60 per ton. The exports in 1915 were the largest that have been recorded, and the annual exports during the past sixteen years have averaged about 20,000 tons.

The total imports of scrap iron and steel in 1915 were 11,477 tons, valued at \$127,614, or an average of \$11.12 per ton, as against imports in 1914 of 27,688 tons, valued at \$337,406, or an average of \$12.19 per ton, and imports in 1913 of 104,747 tons, valued at \$1,488,255, or an average of \$14.21 per ton. The imports during 1913 were the largest recorded, and the average annual imports during the past seventeen years have been about 45,000 tons.

Annual Exports of Scrap Iron and Steel.

Calendar Year.	Short tons.	Value.	Value per ton.	Calendar Year.	Short tons.	Value.	Value per ton.
1900.....	12,548	\$257,868	\$20.55	1908.....	4,628	\$ 73,807	\$15.95
1901.....	9,718	168,438	17.33	1909.....	20,525	305,256	14.87
1902.....	6,691	135,463	20.25	1910.....	11,663	171,603	14.71
1903.....	6,563	88,839	13.54	1911.....	4,208	54,618	12.99
1904.....	7,859	76,125	9.69	1912.....	16,632	145,250	8.73
1905.....	24,109	240,105	9.96	1913.....	45,556	483,813	10.62
1906.....	12,947	235,913	18.22	1914.....	35,405	446,337	12.60
1907.....	11,461	185,430	16.18	1915.....	89,358	883,134	9.88

Annual Imports of Scrap Iron and Steel.

Fiscal Year.	Cast Scrap Iron.				Iron or steel, scrap, wrought, being waste or refuse, including punchings, cuttings and clippings of iron or steel plates or sheets, having been in actual use, scrap ends of tin plate, bars, blooms and rails the same not having been in actual use.				Scrap iron and scrap steel, old and fit only to be remanufactured, being part of or recovered from any vessel wrecked in waters subject to the jurisdiction of Canada.				Total.
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.		
1893.....	729	\$9,317	\$12.78	45,459	\$574,809	\$12.64	.....	.....	.....	46,188	\$584,126	.....
1894.....	78	771	9.88	30,850	369,682	11.98	.....	.....	.....	30,928	370,453	.....
1895.....	643	4,347	6.76	23,390	244,388	10.45	.....	.....	.....	24,033	248,735	.....
1896.....	93	741	7.97	13,607	157,996	11.61	.....	.....	.....	13,700	158,737	.....
1897.....	238	1,362	5.72	7,903	93,541	11.84	.....	.....	.....	8,141	94,903	.....
1898.....	1,559	13,251	8.50	48,769	533,628	10.94	.....	.....	.....	50,462	547,828	.....
1899.....	2,378	22,594	9.50	38,297	298,219	10.54	.....	.....	.....	40,430	373,862	.....
1900.....	13,747	150,681	10.96	38,586	635,008	16.46	.....	.....	.....	52,500	789,186	.....
1901.....	4,499	51,032	11.34	17,922	239,582	13.37	.....	.....	.....	20,764	293,221	.....
1902.....	3,048	38,958	12.78	36,046	519,398	14.41	.....	.....	.....	34,371	559,867	.....
1903.....	7,137	94,028	13.17	43,078	668,971	15.53	.....	.....	.....	50,232	764,430	.....
1904.....	11,785	149,923	13.17	20,969	298,196	14.22	.....	.....	.....	32,412	448,729	.....
1905.....	6,533	75,521	11.56	15,443	210,561	13.63	.....	.....	.....	22,012	286,421	.....
1906.....	4,866	60,086	15.52	21,098	325,269	15.42	.....	.....	.....	36,950	386,575	.....
1907*.....	13,852	198,686	15.34	25,498	412,666	16.18	.....	.....	.....	69,213	870,143	.....
1908.....	26,371	458,489	13.59	32,825	506,698	15.43	.....	.....	.....	39,950	617,549	.....
1909.....	15,190	202,842	13.35	11,022	140,875	12.78	.....	.....	.....	26,212	343,717	.....
1910.....	12,621	153,578	12.17	15,136	191,782	12.61	.....	.....	.....	27,797	345,460	.....
1911.....	20,522	266,026	12.99	30,894	408,075	13.21	.....	.....	.....	51,478	675,431	.....
1912.....	34,831	406,154	11.66	43,544	547,942	12.58	.....	.....	.....	78,378	954,254	.....
Calendar Year.....	49,874	659,319	13.22	54,869	828,860	15.10	.....	.....	.....	104,747	1,488,255	.....
1913.....	10,162	118,299	11.64	17,446	218,553	12.53	.....	.....	.....	27,688	337,406	.....
1915.....	5,136	53,778	10.47	5,912	71,859	12.15	.....	.....	.....	11,477	127,614	.....

* 9 mos.

Prices of Steel Billets.—A record of monthly prices of mild steel billets at Montreal as quoted by the Dominion Iron and Steel Co., is shown in an accompanying table.¹

During 1915 the prices gradually increased during the year, quotations in January and February being from \$24.50 to \$25.00 per long ton, and in December from \$33 to \$35 per long ton, the latter being the highest price reached since 1907.

In Pittsburgh, open-hearth steel billets averaged \$19.50 per long ton during the first five months of the year, increasing steadily during the following seven months to a maximum average of \$30.20 per long ton in December. The price of Bessemer billets followed practically the same changes.

Monthly Prices of Mild Steel Billets at Montreal.*

	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
January.....	\$25.75	\$28.75	\$30.00	\$26.00	\$26.50	\$27.00	\$24.75	\$26.50	\$24.50	\$24.75
February.....	25.00	34.00	30.75	26.00	26.50	27.00	23.75	30.00	24.50	24.75
March.....	25.25	34.50	31.00	26.25	26.50	27.00	23.75	30.00	24.50	26.50
April.....	25.25	34.75	30.75	26.25	26.50	27.00	23.75	30.00	25.25	26.50
May.....	27.00	35.25	31.75	26.25	26.50	26.75	23.75	31.00	25.25	26.50
June.....	27.00	34.50	33.75	26.50	26.00	25.75	23.75	31.00	25.25	26.50
July.....	27.25	34.00	26.75	26.50	26.00	25.75	23.75	29.00	25.25	26.50
August.....	28.00	34.50	27.00	26.50	25.75	25.00	24.25	29.00	25.25	29.50
September.....	27.75	34.00	27.00	26.25	25.50	25.00	24.75	28.00	25.25	31.00
October.....	28.25	33.75	27.25	26.25	25.50	23.75	25.25	26.50	25.25	31.00
November.....	29.75	34.25	27.00	26.25	24.75	23.75	25.25	25.50	24.75	32.00
December.....	29.50	35.00	26.75	26.50	25.00	24.75	26.00	25.50	24.75	34.00
Average.....	27.15	33.94	29.15	26.29	25.91	25.71	24.40	28.50	25.23	28.29

* Average price per ton of 2,240 pounds, f.o.b. Montreal in the first week of each month, quotations supplied by the Dominion Iron & Steel Co., Ltd.

Average Monthly Prices of Bessemer Steel Billets at Pittsburgh.*

	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
January.....	\$26.25	\$29.40	\$28.00	\$25.00	\$27.50	\$23.00	\$20.00	\$28.30	\$20.13	\$19.25
February.....	26.50	29.50	28.00	25.00	27.50	23.00	20.00	28.50	21.00	19.50
March.....	26.70	29.00	28.00	23.00	27.50	23.00	19.75	28.50	21.00	19.70
April.....	27.00	30.12	28.00	23.00	26.75	23.00	20.00	28.50	20.80	20.00
May.....	26.40	30.30	28.00	23.00	26.12	22.60	20.80	27.37	20.00	20.00
June.....	26.63	29.62	25.75	23.00	25.30	21.00	20.87	26.50	19.50	20.50
July.....	27.25	30.00	25.00	23.50	25.00	21.00	21.50	26.60	19.00	21.38
August.....	27.80	29.25	25.00	24.13	24.62	21.00	22.12	26.00	20.25	23.13
September.....	28.00	29.37	25.00	25.00	24.40	20.75	23.62	24.87	21.00	24.10
October.....	28.00	28.20	25.00	26.25	23.75	20.00	26.00	23.30	20.00	24.63
November.....	28.88	28.00	25.00	27.13	23.30	19.50	27.00	21.00	19.25	26.50
December.....	29.50	28.00	25.00	27.50	23.00	19.25	27.00	20.00	19.00	30.60

* As compiled and published by "The Iron Age," New York.

¹ Compiled from the annual records of wholesale prices published by the Department of Labour.

Imports and Exports of Steel Billets.—The Dominion Iron and Steel Co., has, during the past two years, been making some export of steel billets for European demand, but as yet the Department of Customs has not published any separate record thereof.

There has been a considerable annual importation, as shown in the accompanying table of iron and steel billets and of iron and steel ingots, blooms, slabs, puddled bars, etc., the total of such imports during 1915 was 54,118 tons, valued at \$1,270,687, or an average of \$23.48 per ton, as against 13,049 tons valued at \$259,703, or an average of \$19.90 per ton in 1914.

The imports, according to the classification of the Customs Department, include 'iron or steel billets, weighing not less than 60 lbs. per lineal yard' 32,210 tons valued at \$715,493, or \$22.21 per ton in 1915, as against 12,247 tons valued at \$241,234, or \$19.70 per ton in 1914; steel billets, n.o.p. 10,928 tons, valued at \$238,380, or \$21.81 per ton in 1915, as against 647 tons valued at \$15,121, or \$23.37 per ton in 1914; iron or steel ingots, cogged ingots, blooms, slabs, puddled bars and loops, or other forms n.o.p. less finished than iron or steel bars, but more advanced than pig-iron except castings, 10,980 tons, valued at \$316,814 or \$28.85 per ton in 1915, as against 155 tons valued at \$3,348, or \$21.65 per ton in 1914.

The record of imports since 1908 shows that the principal imports have been in the form of billets weighing not less than 60 pounds per lineal yard. The largest import was in 1912 with a total of 89,189 tons, while the average imports during the past twenty years have been about 22,000 tons.

Imports of Iron and Steel Ingots, Blooms, Billets, etc.

Fiscal Year.	Iron and steel billets weighting not less than 60 pounds per lineal yard.			Iron or steel ingots, cogged ingots, blooms, slabs, puddled bars and loops, or other forms, n.o.p., less finished than iron or steel bars, but more advanced than pig-iron, except castings.			Steel billets, n.o.p.			Total.	
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.
1908.....	14,866	\$ 416,163	\$27.99	4,722	\$135,177	\$28.63	1,634	\$48,672	\$29.79	21,222	\$600,012
1909.....	3,940	95,350	24.20	3,715	53,135	14.30	1,232	31,869	25.86	8,887	180,354
1910.....	28,358	518,102	18.27	5,775	97,333	16.85	2,682	63,089	23.52	36,815	678,524
1911.....	44,457	861,036	19.37	3,228	68,616	21.26	711	19,940	28.05	48,396	949,592
1912.....	85,852	1,593,665	18.56	2,608	52,063	19.97	729	17,242	23.65	89,189	1,662,970
Calendar Year											
1913.....	51,765	1,178,151	22.76	655	19,379	29.61	453	14,784	32.67	52,873	1,212,314
1914.....	12,247	241,234	19.70	155	3,348	21.65	647	15,121	23.37	13,049	259,703
1915.....	32,210	715,493	22.21	10,980	316,814	28.85	10,928	238,380	21.81	54,118	1,270,687

Rolling Mill Production.—Statistics of the production in rolling mills have been received from all firms operating both steel furnaces and rolling mills, as well as from a majority of other firms operating rolling mills, and the production in 1915 is reported of steel rails 232,411 tons; wire rods 124,381 tons; plates, sheets and bars, etc., 264,595 tons; angle splice bars, forgings, and other products 34,358 tons. The production in 1914 included: steel rails 428,226 tons; wire rods 63,856 tons; plates, sheets, bars, etc., 143,754 tons, and other products 42,070 tons.

The annual production of rolling mills so far as returns have been furnished to this Department are as follows:—

Annual Production of Rolling Mills.

(IN SHORT TONS.)

Year.	Steel rails.	Wire rods.	Plates, sheets, and bars.	Other products.
1908.....	300,935	41,420		
1909.....	377,642	81,762		
1910.....	399,762	88,456	128,940	28,354
1911.....	399,760	85,811	202,023	62,676
1912.....	471,422	68,174	267,797	36,441
1913.....	554,481	57,389	269,096	51,654
1914.....	428,226	63,856	143,754	42,070
1915.....	232,411	124,381	264,595	34,358

The record of production of finished rolled iron and steel in Canada collected and published by the American Iron and Steel Institute, and the American Iron and Steel Association, which covers a longer period of time and is possibly more complete than that given above, is shown in the following tables quoted from the Annual Statistical Report of the American Iron and Steel Institute for 1914 and special Statistical Bulletin, No. 4, 1916.

Finished Rolled Iron and Steel.

PRODUCTION OF FINISHED ROLLED PRODUCTS, 1895-1909.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1895.....	66,402	1900.....	100,690	1905.....	385,826
1896.....	75,043	1901.....	112,007	1906.....	571,742
1897.....	77,021	1902.....	161,485	1907.....	600,179
1898.....	90,303	1903.....	129,516	1908.....	496,517
1899.....	110,642	1904.....	180,038	1909.....	662,741

PRODUCTION OF FINISHED ROLLED FORMS BY LEADING PRODUCTS

Products.	1910.	1911.	1912.	1913.	1914.	1915
Rails.....	366,465	360,547	423,885	506,709	382,344	209,752
Structural shapes, and wire rods.	80,993	76,617	64,082	68,048	59,050	114,829
Plates and sheets, nail plate, merchant bars, tie-plate bars, etc.....	292,353	344,760	373,257	392,340	218,125	328,737
Total, Gross tons.....	739,811	781,924	861,224	967,097	659,519	653,318

PRODUCTION OF FINISHED ROLLED FORMS, SHOWING IRON AND STEEL SEPARATELY, GROSS TONS, 1904-1915.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1904.....	53,188	126,850	180,038	1910....	83,918	655,893	739,811
1905.....	67,421	318,405	385,826	1911....	86,383	695,541	781,924
1906.....	78,898	492,844	571,742	1912....	109,012	752,212	861,224
1907.....	81,093	519,086	600,179	1913....	95,881	871,216	967,097
1908.....	65,505	431,012	496,517	1914....	47,309	612,210	659,519
1909.....	79,636	583,105	662,741	1915....	40,797	612,521	653,318

PRODUCTION OF STEEL RAILS, 1895-1915.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1895.....	600	1900....	700	1905....	178,885	1910.....	366,465
1896.....	600	1901....	891	1906....	312,877	1911.....	360,547
1897.....	500	1902....	33,950	1907....	311,461	1912.....	423,885
1898.....	600	1903....	1,243	1908....	268,692	1913.....	506,709
1899.....	*835	1904....	36,216	1909....	344,830	1914.....	382,344
						1915.....	209,752

* Includes a few tons of iron rails.

Steel Rails.—The annual production of steel rails in Canada, has, since 1905, varied between 200,000 tons and 500,000 tons per annum, the greater part of which has been for home consumption, although during the past two years there has been some export, the quantity not separately recorded. The "Iron Trade Review,"¹ however, estimated the sales of Canadian steel rails in the United States during 1915 at about 58,500 tons.

The annual imports of steel rails as shown in the following table from 1895 to 1905 ranged between 50,000 and 212,000 tons, averaging about 125,000 tons. From 1906 to date, however, or since the establishment of rail mills at Sydney and Sault Ste. Marie the imports have fallen to an annual average of 60,000 tons, the variation being between a minimum of 10,420 tons in 1915 and a maximum of 177,041 tons in 1913.

¹ Iron Trade Review, March 18, 1915, p. 580.

Annual Imports of Steel Rails, etc.

Fiscal Year.	Steel rails weighing not less than 45 pounds per lineal yard for use in railway tracks.				Steel Rails(a).				Railway Fish Plates.				Railway Tie-plates.				Switches, frogs, crossings and intersections for railways.			
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.	Short tons.	Value.
1895.....	48,629	\$838,144	\$17.24	4,660	\$94,858	\$20.36	2,174 (h)	\$ 50,412	\$23.19	.....	.....	.....	.....	.....	.....	37	\$3,230	\$87.29	.....	.....
1896.....	52,176	1,034,578	19.83	6,692	125,338	18.73	2,233	50,535	22.63	.....	.....	.....	.....	.....	.....	94	4,237	45.07	.....	.....
1897.....	91,194	1,443,857	15.83	4,095	82,354	20.11	3,226	67,511	20.93	.....	.....	.....	.....	.....	.....	60	3,770	62.83	.....	.....
1898.....	105,178	1,810,605	17.21	7,290	89,912	12.33	7,828	171,605	21.92	.....	.....	.....	.....	.....	.....	358	3,303	9.23	.....	.....
1899.....	103,833	1,714,228	16.51	5,384	86,614	17.96	5,821	131,498	22.59	.....	.....	.....	.....	.....	.....	103	3,065	29.75	.....	.....
1900.....	130,617	2,793,903	21.39	5,384	132,689	24.65	8,478	226,280	26.69	.....	.....	.....	.....	.....	.....	630	41,833	66.40	.....	.....
1901.....	125,739	3,329,919	26.48	4,947	142,590	28.82	4,618	165,960	35.94	.....	.....	.....	.....	.....	.....	154	17,301	112.34	.....	.....
1902.....	122,368	2,746,222	22.44	8,285	206,908	24.97	4,094	122,840	30.00	.....	.....	.....	.....	.....	.....	352	20,221	57.45	.....	.....
1903.....	183,603	4,256,064	23.13	12,301	235,904	19.18	7,047	210,081	29.81	.....	.....	.....	.....	.....	.....	475	34,198	72.00	.....	.....
1904.....	189,884	4,329,363	22.80	10,600	263,284	24.84	7,000	208,246	29.75	.....	.....	.....	.....	.....	.....	468	24,616	52.60	.....	.....
1905.....	212,491	5,051,762	23.77	17,904	421,084	23.52	5,396	176,002	32.62	.....	.....	.....	.....	.....	.....	624	41,833	67.04	.....	.....
1906.....	.....	.....	.....	49,878	1,214,548	24.35	4,387	172,267	39.27	.....	.....	.....	.....	.....	.....	687	55,120	80.23	.....	.....
1907*.....	.....	.....	.....	72,811	1,867,865	25.65	4,960 (b)	215,045	43.36	.....	.....	.....	.....	.....	.....	517	46,550	90.04	.....	.....
1908.....	.....	.....	.....	49,187	1,278,084	25.98	1,225	55,193	45.06	.....	.....	.....	.....	.....	.....	1,435	143,781	100.20	.....	.....
1909.....	.....	.....	.....	29,547	797,479	26.99	1,784	67,045	37.58	.....	.....	.....	.....	.....	.....	333	74,527	84.86	.....	.....
1910.....	.....	.....	.....	50,108	1,398,373	27.91	2,526	109,114	43.20	.....	.....	.....	.....	.....	.....	1,150	134,734	117.16	.....	.....
1911.....	.....	.....	.....	32,784	895,984	27.33	1,489	60,788	40.82	.....	.....	.....	.....	.....	.....	957	35,399	36.99	.....	.....
1912.....	.....	.....	.....	91,132	2,429,318	26.66	3,045	130,436	42.83	.....	.....	.....	.....	.....	.....	441	16,164	36.65	.....	.....
Calendar Year	.....	.....	.....	177,041	4,886,117	27.59	3,366	146,493	43.52	.....	.....	.....	.....	.....	.....	2,014	88,220	43.80	.....	.....
1913.....	.....	.....	.....	38,496	979,723	25.45	2,900	113,913	39.28	.....	.....	.....	.....	.....	.....	668	23,137	34.64	.....	.....
1914.....	.....	.....	.....	10,420	297,598	28.56	1,790	69,677	38.92	.....	.....	.....	.....	.....	.....	271	11,943	44.07	.....	.....
1915.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* 9 mos. (a) Iron and steel railway bars or rails of any form, punched or not, n.o.p., for railways, which term, for the purposes of this item, shall include all kinds of railways, street railways and tramways, even although they are used for private purposes only, and even although they are not used or intended to be used in connexion with the business of common carrying of goods or passengers. (b) Fish plates and tie-plates from 1895 to 1907 inclusive.

Wire Rods.—The production of wire rods in Canadian rolling mills reached a maximum in 1915 amounting to 124,381 tons and was double the production of the previous year. From 1908 to 1914 inclusive, the average annual production was about 70,000 tons. The imports of wire rods in the coil in 1915 were 71,839 tons valued at \$1,695,842, or \$23.60 per ton, as compared with imports in 1914 of 65,250 tons valued at \$1,472,597 or \$22.57 per ton and imports in 1913 of 79,608 tons valued at \$1,962,235, or \$24.65 per ton. The annual imports have varied between rather wide limits, as shown by the following table, the highest figure having been reached during the fiscal year of 1913, with a total of 91,919 tons.

The monthly price of wire rods in Pittsburgh in 1915 advanced from \$25 per gross ton during the first six months of the year to a maximum of \$39.50 in December.

Annual Imports of Wire Rods.

Fiscal Year.	Short tons	Value.	Value per ton.	Fiscal Year.	Short tons.	Value.	Value per ton.
1898.....	33,589	\$ 658,153	\$19.59	1908.....	9,862	\$ 295,122	\$29.93
1899.....	34,800	765,777	22.01	1909.....	20,312	538,378	26.51
1900.....	41,994	1,196,593	28.49	1910.....	28,071	749,117	26.69
1901.....	20,505	645,136	31.46	1911.....	36,032	965,912	26.81
1902.....	55,182	1,522,792	27.60	1912.....	43,397	1,033,397	23.81
1903.....	50,624	1,415,447	27.96	1913.....	91,919	2,144,405	23.33
1904.....	42,313	1,134,149	26.80	Calendar Year			
1905.....	31,730	792,078	24.96	1913.....	79,608	1,962,235	24.65
1906.....	18,811	478,991	25.46	1914.....	65,250	1,472,597	22.57
1907.....	11,050	306,039	27.70	1915.....	71,839	1,695,842	23.60

Average Monthly Prices of Bessemer Wire Rods at Pittsburgh.*

	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
January....	\$33.75	\$37.00	\$34.30	\$33.00	\$33.00	\$28.00	\$24.37½	\$30.00	\$25.50	\$25.00
February...	34.00	37.00	35.00	33.00	33.00	28.75	25.00	30.00	26.38	25.00
March.....	34.00	37.00	35.00	33.00	33.00	29.00	25.00	30.00	26.50	25.00
April.....	34.12½	37.00	35.00	29.00	32.50	29.00	25.00	30.00	26.00	25.00
May.....	34.40	37.00	35.00	27.50	32.00	29.00	25.00	30.00	25.50	25.00
June.....	34.00	37.12½	33.50	27.50	30.80	28.25	25.00	29.50	24.50	25.00
July.....	34.00	36.50	33.00	29.40	29.25	27.00	25.00	28.30	24.50	25.63
August.....	34.00	36.10	33.25	31.00	28.25	27.00	25.80	28.00	25.00	27.00
September..	34.00	36.00	33.00	31.50	28.00	27.00	27.00	27.37½	26.20	29.40
October....	34.50	35.40	33.00	31.87½	28.50	26.00	28.50	26.60	25.88	31.75
November..	35.50	34.00	33.00	32.50	28.12½	25.30	29.75	25.87½	25.25	36.25
December..	37.00	34.00	33.00	33.00	28.00	24.50	30.00	25.17	25.00	39.50

* As compiled and published by "The Iron Age," New York.

Tin Plate.—There is no production of tin plate in Canada. The imports during 1915 were 45,165 tons, valued at \$2,883,951, as compared with imports in 1914 of 50,791 tons, valued at \$3,151,385. The imports during the past ten years have averaged about 42,200 tons per annum.

Annual Imports of Tin Plate.

Year.	Tons.	Value.	Year.	Tons.	Value.
Fiscal Year.			Fiscal Year.		
1891.....	10,734	\$ 854,770	1904.....	24,820	\$1,461,811
1892.....	19,296	1,235,961	1905.....	30,000	1,751,507
1893.....	15,131	892,106	1906.....	30,259	1,869,000
1894.....	15,369	956,813	1907.....	22,628	1,516,777
1895.....	13,022	681,739	1908.....	34,876	2,437,540
1896.....	16,910	923,279	1909.....	26,859	1,682,366
1897.....	18,768	919,596	Calendar Year.		
1898.....	22,864	1,150,741	1909.....	36,904	2,216,089
1899.....	16,575	927,036	1910.....	39,101	2,475,010
1900.....	25,108	1,683,788	1911.....	47,006	3,172,943
1901.....	27,165	1,466,965	1912.....	60,502	3,826,735
1902.....	27,207	1,528,655	1913.....	58,031	3,954,615
1903.....	30,251	1,806,643	1914.....	50,791	3,151,385
			1915.....	45,165	2,883,951

EXPORTS AND IMPORTS OF IRON AND STEEL GOODS

The exports of iron and steel from Canada consist chiefly of manufactured goods such as agricultural implements, automobiles, bicycles, machinery, etc. Compared with the value of imports, the total value of exports previous to 1915 has been small, amounting to not more than 10 per cent of the former.

During 1915, however, not only has there been a large export of steel in munitions, but an important export business in iron and steel goods has been undertaken.

The Algoma Steel Corporation sold a considerable tonnage of steel rails in the United States; while export orders for Great Britain and France, in billets, rods and wire products, made up a large part of the business of the Dominion Iron & Steel Co.

The total recorded value of iron and steel exported during the calendar year 1915, was \$48,268,148 as compared with a value of exports in 1914 of \$14,391,746, and in 1913 of \$13,999,149.

The exports during 1915 included pig-iron and ferro-alloys, 26,545 tons valued at \$768,632; scrap iron and steel 89,358, valued at \$883,134; wire and wire nails 71,998 tons, valued at \$3,224,740; agricultural implements, valued at \$3,417,060; automobiles and bicycles \$7,139,712; other manufactures of iron and steel \$32,834,870.

The exports during 1914 included: pig-iron and ferro-alloys 19,063 tons, valued at \$486,366; scrap iron and steel 35,405 tons, valued at \$446,337; wire and wire nails 9,663 tons, valued at \$355,781; agricultural implements, valued at \$5,788,899; automobiles and bicycles \$3,409,749; other manufactures of iron and steel \$3,904,614.

The exports during 1913 in similar groupings were: pig-iron and ferro-alloys 6,326 tons, valued at \$351,646; scrap iron and steel 45,556 tons, valued at \$483,813; agricultural implements valued at \$7,411,246; auto-

mobiles and bicycles \$3,630,964; other manufactures of iron and steel \$2,121,480.

A detailed record of these exports during the past two years is shown in the accompanying table:—

Exports of Iron and Steel Goods, the Product of Canada, During the Calendar Years 1914 and 1915.

		1914.			1915.		
		Quantity.	Value.	Average value.	Quantity.	Value.	Average value.
Stoves.....	No.	4,198	\$ 25,149	\$ 5.99	1,271	\$ 18,563	\$ 14.61
Gas buoys and parts of.....	\$		21,009			2,017	
Castings, n.e.s.....	"		24,218			143,714	
Pig-iron.....	Tons	14,198	201,145	14.17	17,307	231,551	13.38
Ferro-silicon and ferro-compounds ..	"	4,865	285,221	57.45	9,238	537,081	58.14
Wire and wire-nails ..	"	9,663	355,781	36.82	71,998	3,224,740	44.79
Machinery (linotype machines). ..	\$		5,562			6,946	
Machinery, n.e.s.....	"		344,689			536,162	
Sewing machines.....	No.	2,109	31,392	14.88	2,557	30,479	11.92
Washing machines, etc.....	\$		33,986			20,334	
Typewriters.....	No.	3,055	200,441	65.61	3,175	206,811	65.14
Scrap iron and steel.....	Tons	35,405	446,337	12.60	89,358	883,134	9.88
Hardware, tools, etc.....	"		95,497			321,021	
Hardware, n.e.s.....	"		190,763			401,053	
All other iron and steel.....	"		2,931,908			31,147,770	
Agricultural implements—							
Mowing machines.....	No.	21,457	725,831	33.83	5,031	175,912	34.97
Reapers.....	"	3,919	223,228	56.96	471	21,105	44.80
Drills.....	"	3,961	259,701	65.56	6,400	422,772	66.06
Harvesters.....	"	19,474	2,015,996	103.52	7,668	809,141	105.52
Ploughs.....	"	12,896	324,349	25.15	14,923	309,286	20.73
Harrows.....	"	6,252	92,556	14.80	4,459	81,731	18.33
Hay rakes.....	"	6,524	196,519	30.12	1,758	40,289	22.92
Seeders.....	"	32	1,810	56.56	2	87	43.50
Threshing machines.....	"	1,965	799,307	406.77	1,001	568,401	567.83
Cultivators.....	"	6,030	146,668	24.32	5,957	166,602	27.97
All other.....	\$		290,520			302,355	
Parts of.....	"		712,414			519,379	
Automobiles.....	No.	5,621	3,011,327	535.73	13,475	6,756,395	501.40
" parts of.....	\$		384,428			363,178	
Bicycles.....	No.	111	10,021	90.28	116	4,692	40.45
" parts of.....	\$		3,973			15,447	
Total.....			14,391,746			48,268,148	

Annual Exports of Iron and Steel Products since 1884.

Year.	Value.	Year.	Value.	Year.	Value.
1884.....	\$186,854	1895.....	\$ 174,778	1906.....	\$ 1,552,963
1885.....	115,158	1896.....	284,296	1907.....	1,607,368
1886.....	228,027	1897.....	592,849	1908.....	2,098,138
1887.....	251,221	1898.....	593,060	1909*	7,172,413
1888.....	184,214	1899.....	975,377	1910.....	7,895,489
1889.....	144,909	1900.....	1,570,013	1911.....	9,907,281
1890.....	133,724	1901.....	1,837,179	1912.....	10,682,484
1891.....	152,919	1902.....	2,751,324	1913.....	13,999,149
1892.....	155,597	1903.....	3,058,320	1914.....	14,391,746
1893.....	214,636	1904.....	1,318,482	1915.....	48,268,148
1894.....	167,183	1905.....	1,287,558		

* Agricultural implements, automobiles, and bicycles included in 1909 and subsequent years.

A record of the annual exports of pig-iron and ferro-alloys has already been given on page 106, and of the annual exports of scrap iron and steel, on page 111.

The total value of the imports of iron and steel goods during the calendar year 1915 was \$74,308,983, as compared with a value of \$80,063,679 imported during the calendar year 1914, and \$145,226,972 imported during 1913. Previous to 1913 the record is shown covering the fiscal periods. During the twelve months ending March, 1913, the imports were valued at \$148,579,272, as against imports valued at \$105,614,450 during the twelve months ending March, 1912.

Between 1895 and 1904, the imports of iron and steel increased from about \$8,600,000 to over \$40,000,000. During the next five years there was comparatively little change, but from 1909 to 1913 the increase was again very rapid. During the latter part of 1913 there was, however, a distinct check to imports with the heavy falling off shown in 1914 and 1915. A detailed statement of the imports of iron and steel during the calendar years 1915 and 1914 is shown in the general tables of imports of iron and steel goods following.

The imports during 1915, subject to duty, were valued at \$62,842,171, the imports free of duty during the same period being valued at \$11,466,812. The imports during 1914 subject to duty were valued at \$64,901,486, and the imports free of duty during the same period were valued at \$15,162,193. These imports include all classes of manufactured iron and steel goods as well as those of the cruder form. In many cases the values only of the imported goods are given, so that a total tonnage of imports cannot be stated. In the case of most of the cruder materials, however, the quantities are given, and a compilation of these showing the importation of the cruder forms of iron and steel since 1909 is shown in the accompanying tables.

Thus during the twelve months ending December, 1915, there were imported 771,007 tons of iron and steel valued at \$27,504,685, or an average value per ton of \$35.67, together with other iron and steel goods of which the quantities are not stated, valued at \$46,804,298.

During the twelve months ending December, 1914, there were imported 878,179 tons of iron and steel valued at \$28,825,173, or an average value per ton of \$32.82, together with other iron and steel goods of which the quantities are not stated, valued at \$51,238,306.

During the twelve months ending December, 1913, there were imported 1,890,506 tons of iron and steel goods, valued at \$59,882,222, or an average value per ton of \$31.67, together with other iron and steel goods of which the quantities are not stated, valued at \$85,344,750.

The 1915 imports show an increase in the case of ingots and billets, bars, rods and bands, and forgings, etc., but all other groupings show a falling off in imports.

Summary of Imports of Iron and Steel,* 1915.

Material.	Tons.	Value.	Average.
Pig-iron.....	47,482	\$ 624,200	\$13.15
Ferro-products and chrome steel.....	13,905	820,976	59.04
Ingots, blooms, billets, puddled bars, etc.....	54,118	1,270,687	23.48
Scrap iron and scrap steel.....	11,477	127,614	11.12
Plates and sheets.....	224,484	7,647,560	34.07
Tin plates and sheets.....	45,165	2,883,951	63.85
Bars, rods, hoops, bands, etc.....	156,990	5,829,088	37.13
Structural iron and steel.....	126,780	3,615,333	28.52
Rails and connexions.....	12,481	379,218	30.38
Pipe and fittings (a).....	4,489	110,978	24.72
Nails and spikes.....	1,522	86,876	57.08
Wire (a).....	49,529	2,175,834	43.93
Forgings, castings, and manufactures.....	22,585	1,932,370	85.56
Total.....	771,007	27,504,685	35.67
Other iron and steel products valued at.....		46,804,298	.....
Total value of imports of iron and steel.....		74,308,983	.....

* For details of these items see general tables following.

(a) There are additional imports of pipe and wire included under "other iron and steel products."

Summary of Imports of Iron and Steel*, 1914.

Material.	Tons.	Value.	Average.
Pig-iron.....	78,680	\$ 982,189	\$12.48
Ferro-products and chrome steel.....	22,271	560,686	25.18
Ingots, blooms, billets, puddled bars, etc.....	13,049	259,703	19.90
Scrap iron and scrap steel.....	27,688	337,406	12.19
Plates and sheets.....	227,633	7,877,729	34.61
Tin plates and sheets.....	50,791	3,151,385	62.05
Bars, rods, hoops, bands, etc.....	148,368	5,138,193	34.63
Structural iron and steel.....	160,538	4,214,520	26.25
Rails and connexions.....	42,064	1,116,773	26.55
Pipe and fittings (a).....	15,614	395,466	25.33
Nails and spikes.....	4,864	210,098	43.20
Wire (a).....	66,280	3,205,635	48.37
Forgings, castings, and manufactures.....	20,339	1,375,590	67.63
Total.....	878,179	28,825,373	32.82
Other iron and steel products valued at.....		51,238,306	.....
Total value of imports of iron and steel.....		80,063,679	.....

* For details of these items see general tables following.

(a) There are additional imports of pipe and wire included under "other iron and steel products."

Summary of Imports of Iron and Steel, 1913.

Material.	Tons.	Value.	Average.
Pig-iron.....	236,769	\$ 3,247,405	\$13.72
Ferro-products and chrome steel.....	30,678	970,100	31.62
Ingots, blooms, billets, puddled bars, etc.....	52,872	1,212,314	22.93
Scrap iron and scrap steel.....	104,747	1,488,255	14.21
Plates and sheets.....	365,675	13,965,865	38.19
Tin plates and sheets.....	58,031	3,954,615	68.14
Bars, rods, hoops, bands, etc.....	277,879	10,195,280	36.69
Structural iron and steel.....	439,871	12,739,954	28.96
Rails and connexions.....	182,421	5,120,830	28.07
Pipe and fittings (a).....	30,663	847,922	27.65
Nails and spikes.....	7,584	360,489	47.53
Wire (a).....	70,712	3,688,660	52.16
Forgings, castings, and manufactures.....	32,604	2,090,533	64.12
Total.....	1,890,506	59,882,222	31.67
Other iron and steel products valued at.....	.....	85,344,750	.....
Total value of imports of iron and steel.....	.....	145,226,972	.....

(a) There are additional imports of pipe and wire included under "other iron and steel products."

Summary of Tonnage of Iron and Steel Imported 1909-1913.

(IN SHORT TONS.)

Material.	TWELVE MONTHS ENDING MARCH.				
	1909.	1910.	1911.	1912.	1913.
Pig-iron.....	58,591	159,506	270,102	201,112	291,904
Ferro-products and chrome steel.....	13,206	15,153	19,182	18,548	23,378
Ingots, blooms, billets, puddled bars, etc.....	8,887	36,819	48,395	89,190	86,745
Scrap iron and scrap steel.....	26,212	28,797	53,824	78,378	103,317
Plates and sheets.....	116,610	200,575	205,690	243,461	376,633
Tin plates and sheets.....	26,859	39,866	44,025	45,802	64,571
Bars, rods, hoops, bands, etc.....	73,261	117,159	183,865	195,139	278,878
Structural iron and steel.....	162,735	195,748	232,585	268,572	377,551
Rails and connexions.....	32,543	55,183	36,690	97,062	156,318
Pipe and fittings.....	18,309	16,705	28,831	26,627	40,987
Nails and spikes.....	1,611	3,476	3,374	7,201	11,420
Wire.....	39,375	68,211	64,850	69,597	80,846
Forgings, castings, and manufactures.....	14,394	18,093	24,523	27,668	47,195
Total.....	592,593	955,291	1,215,936	1,368,357	1,939,743

Annual Imports of Iron and Steel Products since 1895.

Year.	Value.	Year.	Value.
1895(a).....	\$ 8,684,024	1906(a).....	\$42,210,305
1896.....	10,206,759	1907*.....	44,739,403
1897.....	11,063,156	1908(b).....	64,257,238
1898.....	16,340,992	1909.....	42,075,797
1899.....	19,463,329	1910.....	62,356,974
1900.....	27,926,766	1911.....	88,179,152
1901.....	25,023,453	1912.....	105,614,450
1902.....	31,591,488	1913(b).....	148,579,272
1903.....	39,536,867	1913(c).....	145,226,972
1904.....	40,449,175	1914.....	80,063,679
1905.....	40,820,233	1915(c).....	74,308,983

* Nine months ending March, 1907.

(a) Twelve months ending June from 1895 to 1906 inclusive.

(b) Twelve months ending March from 1908 to 1913 inclusive.

(c) Twelve months ending December from 1913 to date.

Imports of Iron and Steel Goods Subject to Duty, 1914 and 1915.

Material.	CALENDAR YEAR 1914.			CALENDAR YEAR 1915.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
Agricultural implements, n.o.p., viz.—						
Binding attachments.....	.....	\$ 3,548	.....	.....	\$ 5,728	.....
Cultivators and weeders and parts of.....	.....	48,246	.....	.....	43,089	.....
Drills, seed.....	3,928	58,886	\$14.98	4,033	47,505	\$11.78
Farm, road, or field rollers.....	443	122,429	276.36	242	19,639	81.15
Forks, pronged.....	9,168	5,218	0.57	6,978	3,383	0.48
Harrows and parts of.....	.....	79,107	.....	.....	53,354	.....
Harvesters, self-binding.....	1,676	181,210	108.12	3,041	330,602	108.71
Hay loaders.....	219	10,966	50.07	105	4,507	42.92
Hay tedders.....	15	607	40.47	48	1,302	27.13
Hoes.....	9,950	2,775	0.28	3,894	1,131	0.29
Horse rakes.....	770	14,754	19.16	997	18,749	18.81
Knives, hay or straw.....	4,835	2,061	0.43	834	87	0.31
Knives edging.....	138	88	0.64	230	87	0.38
Lawn mowers.....	14,258	59,424	4.17	10,486	41,149	3.92
Manure spreaders.....	1,037	66,309	63.94	487	31,063	63.78
Mowing machines.....	1,260	46,042	37.33	2,189	72,431	33.09
Ploughs and parts of.....	.....	501,704	.....	.....	524,124	.....
Post hole diggers.....	4,691	4,495	0.96	2,862	2,538	0.89
Potato diggers.....	1,435	44,036	30.69	543	19,393	35.71
Rakes, n.o.p.....	26,552	5,346	0.20	9,878	2,473	0.25
Reapers.....	395	30,434	77.05	155	8,369	53.99
Scythes.....	3,029	14,805	4.89	2,884	14,873	5.16
Sickles or reaping hooks.....	289	631	2.18	399	669	1.68
Snaths.....	10	17	1.70	241	1,037	4.30
Spades and shovels of iron or steel, n.o.p.....	4,694	19,438	4.14	3,038	8,315	2.74
Spade and shovel blanks, and iron or steel cut to shape for the same.....	1,549	2,883	1.86	2,343	1,935	0.83
Parts of agricultural implements paying 12½, 17½ and 17½ per cent*.....	.....	191,070	.....	.....	90,310	.....
Parts of agricultural implements paying 12½, 17½ and 20 per cent, n.o.p.....	.....	204,874	.....	.....	108,982	.....
All other agricultural implements, n.o.p.....	.....	81,867	.....	.....	71,776	.....
Anvils and vises.....	190.5	54,163	.....	.....	44,559	.....
Cart or wagon skins or boxes.....	.....	20,714	108.73	51.4	5,787	112.59
Springs, n.o.p., and parts thereof, of iron or steel, for railway, tramway, or other vehicles.....	.....	65,206	.....	.....	166,135	.....
Axles and axle parts, n.o.p., and axle blanks and parts thereof, of iron or steel for railway, tramway, or other vehicles.....	.....	221,513	.....	.....	751,344	.....
Bar iron or steel, rolled, whether in coils, bundles, rod or bars, comprising rounds, ovals, squares, and flats, n.o.p.....	49,693.8	1,442,734	29.03	57,813	1,858,487	32.15
Butts and hinges, n.o.p.....	.....	92,375	.....	.....	55,071	.....

* 12½, 12½, and 12½ per cent from April, 1915.

Canada plates, Russia iron, terne plate, and rolled sheets of iron or steel coated with zinc spelter or other metal, of all widths or thicknesses, n.o.p.	Tons	8,369.9	\$135,622	\$52.05	9,363.3	\$487,797	\$52.10
Castings, iron or steel, n.o.p.	Tons	15,614.1	71,812	25.33	4,489	121,232	24.72
Castings, malleable iron, when imported by manufacturers of mowers, binders, harvesters and reapers for use exclusively in their own factories	Tons	10,162	118,299	11.64	5,136	110,978	10.47
Cast-iron pipe of every description	Tons	1,012.6	82,957	81.92		53,778	
Chains, coil chain, chain links, and chain shackles of iron or steel of 5-16 in. diameter, and over	"						
Chain, coil chain, chain links, including repair links and chain shackles, of iron or steel, 1½ of an inch. in diameter and over	"						
Chains, coil chains and links, including repair links and chain shackles of iron or steel n.o.p.	"						
Chains, n.o.p.	"						
Tacks, shoe	Tons	698.5	55,321	79.20		31,191	90.72
Nails, brads, spikes, and tacks of all kinds, n.o.p.	Tons	14.9	95,421	2.105		71,479	75.74
Engines, etc.—	Tons	324.4	2,105	141.28	24	80,668	133.04
Locomotives for railways	No.		38,001	117.14	151.2	3,193	164.65
Locomotive parts	No.	89	2,925.22		46	24,895	
Motor cars for railways and tramways	No.	23	76,444			148,022	3,217.87
Engines, fire	No.	28	260,345			80,519	
Engines, gasoline and gas	"	15,392	47,967	2,083.52		42,451	544.24
Engines, steam	"	356	105,572	3,770.40		55,785	4,291.15
Boilers, steam and parts of	"		1,959,637	127.31	20,981	2,786,559	132.81
Boilers, n.o.p., and parts of	"		248,820	698.93	124	142,533	1,149.46
Fire extinguishing machines, including sprinklers for fire protection	"		236,691			86,839	
Fittings, iron or steel, for iron or steel pipe of every description	"		278,262			117,657	
Flat eye-bar blanks, not punched or drilled, for use exclusively in the manufacture of bridges or of steel structural work, or in car construction	"		103,316			94,735	
Ferro-silicon, spiegeleisen, and ferro-manganese	"		780,884			485,205	
Ferro-silicon, containing more than 15 per cent silicon	"	3,035	206,456	68.02	4,070	267,644	65.70
Ferro-silicon, containing not more than 15 per cent silicon	"	5,741	152,245	26.52	(a)	3,225	26.88
Spiegeleisen and ferro-manganese containing not more than 15 per cent manganese and other ferro-alloys, n.o.p.	"	1	88	88.00	(b)	163	81.50
Forgings of iron or steel of whatever size or shape, or in whatever stage of manufacture, n.o.p., and steel shafting turned, compressed or polished, and hammered, drawn or cold rolled iron or steel bars or shapes, n.o.p.	"					35,214	41.92
Hardware, viz., builders', cabinet-makers', upholsterers', harness-makers', saddlers', and carriage hardware, including curry-combs, n.o.p.	"	2,375	68,445	28.82	156	44,972	288.28
Horse, mule, and ox shoes	"						
Iron or steel billets, weighing not less than 60 pounds per lineal yard	"						
Iron or steel ingots, clogged ingots, blooms, slabs, puddled bars and loops, or other forms, n.o.p., less finished than iron or steel bars, but more advanced than pig-iron except castings	"						
Iron or steel bridges or parts thereof, iron or steel structural work, columns, shapes or sections, drilled, punched, or in any further stage of manufacture, than as rolled or cast, n.o.p.	"	154.6	3,348	21.65	10,979.9	316,814	28.85
Iron in pig	Tons						
Iron in pig charcoal	Tons						
Locks of all kinds	Tons						

(a) Three months, January, February, March.

(b) Nine months, April to December inclusive.

Imports of Iron and Steel Goods Subject to Duty—Continued.

Material.	CALENDAR YEAR, 1914.			CALENDAR YEAR, 1915.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
Machines, machinery, etc.—						
Automobiles and motor vehicles of all kinds.	No. 5,599	\$ 5,296,831	\$ 946.03	6,210	\$ 4,223,233	\$ 680.07
Automobiles and motor vehicles, parts of.	No. 145	2,785,634			3,696,267	2,583.42
Cranes and derricks.	No. 47	448,176	3,090.87	59	232,508	5,94.42
Dental engines, electric.	" 783	4,000	85.10	773	5,571	14,718
Farming mills.	" 366	18,094	23.11	193	14,718	19.04
Grain crushers.	" 188	6,593	18.01	143	6,579	34.09
Hay presses.	" 31,349	166.75			36,843	257.64
Windmills and complete parts thereof.	" 50,596				38,845	
Ore crushers and rock crushers, stamp mills, cornish and belted rolls, rock drills, air compressors, and percussion coal cutters.	" 459,531				300,544	
Portable machines—						
Fodder or feed cutters.	No. 665	10,506	15.80	947	33,868	35.76
Horse powers for farm purposes.	" 3	93	31.00	1	23	23.00
Portable engines with boilers in combination and traction engines for farm purposes.	" 532	854,364	1,605.95	497	870,756	1,752.02
Portable sawmills and planing mills.	" 12	3,261	271.75	10	4,270	427.00
Steam shovels and electric shovels.	" 29	215,356	7,426.07	25	99,681	3,987.24
Threshing machine separators.	" 607	308,283	507.88	983	616,258	626.92
Threshing machine separators, parts of, including wind-stackers, baggers, weighers, and self-feeders for same, and finished parts thereof for repairs, when imported separately.	" 223,009				279,225	
All other portable machines, n.o.p., and parts of.	" 119,758				16,703	
Concrete mixing machines.	No. 156	66,121	423.85	79	31,369	397.08
Sewing machines.	" 15,667	281,164	17.95	14,814	328,582	22.18
Sewing machines, parts of.	" 73,424				92,613	
Adding machines.	" 1,470	269,766	183.51	590	134,894	228.63
Machines, typewriting.	" 9,051	514,831	56.88	5,622	297,123	52.85
Machines, specially designed for ruling, folding, binding, embossing, creasing, or cutting paper or cardboard, when for use exclusively by printers, bookbinders, and by manufacturers of articles made from paper or cardboard, including parts thereof, composed wholly or in part of iron, steel, brass, or wood.						
Printing presses and lithographic presses.	\$ 231,832				136,999	
Type-making accessories for printing presses.	" 308,907				224,551	
Cement making machinery.	" 16,574				24,814	
Coal handling machinery.	" 49,097				20,053	
Paper and pulp mill machinery.	" 190,500				36,764	
Rolling mill machinery.	" 414,396				443,959	
Sawmill machinery.	" 147,219				150,841	
Machinery of a class or kind not made in Canada and parts thereof adapted for carding, spinning, weaving, braiding, or knitting fibrous material, when imported by manufacturers for such purposes.	" 140,699				137,086	
		581,918			843,040	

Imports of Iron and Steel Goods Subject to Duty.—Continued.

Material.	CALENDAR YEAR, 1914.			CALENDAR YEAR, 1915.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
Steel billets, n.o.p.....Tons	647.2	\$ 15,121	\$ 23.37	10,928.4	\$238,380	\$ 21.81
Stoves, of all kinds, for coal, wood, oil, spirits or gas.....Tons	.....	563,371	.....	.....	253,104	.....
Stove urns of metal, and dovetails, chaplet and hinge tubes of tin for use in the manufacture of stoves.....Tons	.....	11,948	.....	.....	9,801	.....
Switches, frogs, crossings, and intersections for railways.....Tons	.....	148,848	.....	.....	39,417	.....
Tubing:—						
Wrought or seamless tubing, plain or galvanized, threaded and coupled or not, over 10 in. in diameter, n.o.p.....Tons	.....	185,311	.....	.....	112,692	.....
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, over 4 in. but not exceeding 10 in. in diameter, n.o.p.....Tons	.....	201,408	.....	.....	74,893	.....
Wrought or seamless tubing, iron or steel, plain or galvanized, threaded and coupled, or not, 4 in. or less in diameter, n.o.p.....Tons	.....	164,147	.....	.....	109,536	.....
Seamless steel tubing, valued at not less than 3½ cents per lb.....Tons	211.8	30,314	143.13	383.0	56,347	147.12
Rolled or drawn square tubing of iron or steel, adapted for use in the manufacture of agricultural implements.....Tons	.....	6,036	.....	.....	94	.....
Iron or steel pipe or tubing, plain or galvanized, riveted, corrugated or otherwise specially manufactured, including lockjoint pipe, n.o.p.....Tons	.....	469,598	.....	.....	181,607	.....
Iron or steel pipe, not built or lap welded, and wire bound wooden pipe, not less than 30 in. internal diameter when for use exclusively in alluvial gold mining.....Tons	.....	1,211	.....	.....	597	.....
Ware—Agate, granite, or enamelled iron or steel ware.....Tons	.....	241,813	.....	.....	117,215	.....
Ware—Iron or steel hollow ware, plain black or coated, n.o.p., and nickel and aluminium kitchen or household hollow ware, n.o.p.....Tons	.....	161,443	.....	.....	150,063	.....
Wire bale ties.....Tons	.....	8,436	.....	.....	5,401	.....
Wire bound wooden pipe, n.o.p.....Tons	.....	1,624	.....	.....	38	.....
Wire cloth or woven wire and netting of iron and steel.....Tons	2,236.9	243,885	109.02	.....	204,055	.....
Wire, crucible cast steel, valued at not less than 6 cents per lb.....Tons	110.0	34,390	312.64	136.7	47,619	348.35
Wire screens, doors, and windows.....Tons	.....	39,587	.....	.....	17,182	.....
Wire buckthorn strip fencing, woven wire fencing, and wire fencing, of iron and steel, n.o.p., not to include woven wire or netting made from wire, smaller than No. 14 gauge, not to include fencing or wire larger than No. 9 gauge.....Tons	945.4	74,182	78.47	.....	29,778	.....
Wire, single or several, covered with cotton, linen, silk, rubber, or other material, including cable so covered.....Tons	.....	401,590	.....	.....	176,657	.....
Wire of iron and steel all kinds, n.o.p.....Tons	3,810.5	198,464	52.08	.....	152,674	57.66
Wire rope, stranded or twisted wire clothes lines, picture or other twisted wire, and wire cables, n.o.p.....Tons	2,670.3	432,099	161.81	.....	272,604	.....
Iron or steel nuts, rivets, or bolts with or without threads, nut, bolt, and hinge blanks, and T and strap hinges of all kinds, n.o.p.....Tons	2,147.8	169,929	79.12	1,780.2	156,960	88.17
Iron or steel scrap, wrought, being waste or refuse, including punchings, cuttings, and clippings of iron or steel plates or sheets having been in actual use: crop ends of tin plate bars, blooms, and rails, the same not having been in actual use.....Tons	17,446.3	218,553	12.53	5,911.7	71,859	12.16
Penknives, jack-knives, and pocket knives of all kinds.....Tons	.....	81,715	.....	.....	94,585	.....
Knives and forks of steel, plated or not, n.o.p.....Tons	.....	210,260	.....	.....	150,145	.....
All other cutlery, n.o.p.....Tons	.....	539,548	.....	.....	314,813	.....

Guns, rifles, including air guns and air rifles (not being toys), muskets, cannons, pistols, revolvers, or other firearms.....	718,211	.....	.....	.....	484,149	.....
Bayonets, swords, fencing foils, and masks.....	8,612	.....	.....	.....	11,331	.....
Needles of any material or kind, n.o.p.....	117,408	.....	.....	.....	146,480	.....
Steel, chrome steel.....	11,201	.....	90.40	.....	13,664	93.21
Steel plate, universal mill or rolled edge plates of steel over 12 in. wide, imported by manufacturers of bridges or of structural work, or for use in car construction.....	29,277.8	.....	.....	.....	849,597	34.42
Steel in bars or sheets to be used exclusively in the manufacture of shovels when imported by the manufacturer of shovels.....	653.7	.....	.....	.....	47,368	26.40
Roller of iron or steel, cast steel bars, bands, hoops, scroll, or strip, sheet, or plate of any size, thickness, or width, galvanized or coated with any material or not, and steel bars for the manufacture of milling cutters, which of greater value than 3½ cents per pound.....	17,082	.....	26.13	.....	.....	.....
Steel balls adapted for use in bearings of machinery and vehicles.....	779,716	.....	126.32	.....	1,104,073	139.78
Flat steel, cold rolled, not over ½ in. thick, for the manufacture of cups and cones for ball bearings.....	19,747	.....	.....	.....	22,691	.....
Steel wool.....	172	.....	61.43	.....	2,654	66.85
Tools and implements.....	4,729	.....	.....	.....	2,468	.....
Axes, cleavers, hatchets, wedges, sledges, hammers, crowbars, cant-dogs, and track tools, picks, mattocks and eyes and poles for the same.....	47,608	.....	.....	.....	22,995	.....
Saws.....	26,195	.....	6.47	.....	8,363	5.40
Files and rasps.....	83,150	.....	.....	1,549	80,996	.....
Tools, hand of all kinds, n.o.p.....	101,609	.....	.....	.....	97,329	.....
Knife blades or blanks and table forks of iron or steel, in the rough, not handled, filed, ground, or otherwise manufactured.....	621,039	.....	.....	.....	510,268	.....
Manufactures, articles or wares of iron or steel, or of which iron and steel (or either) are the component materials of chief value, n.o.p.....	87	.....	.....	.....	126	.....
.....	7,542,806	.....	.....	.....	5,458,284	.....
.....	64,901,486	.....	.....	.....	62,842,171	.....

Imports of Iron and Steel Goods Free of Duty, 1914 and 1915.

Material.	CALENDAR YEAR, 1914.			CALENDAR YEAR, 1915.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
Anchors for vessels.....Tons	425.5	\$ 30,943	\$72.72	283.0	\$ 27,669	\$97.77
Canada plates, Russian, iron, three plates and rolled sheets of iron, or steel coated with zinc, or other material, of all widths or thickness, n.o.p.....Tons	6,430.6	301,417	46.87	2,190.8	115,003	52.49
Chain, iron, coil chain links including repair links and chain shackles of iron or steel 14 in. in diameter and over.....Tons	263.1	19,722	75.48	50.3	3,939	78.31
Chain, malleable sprocket or link, being when imported by manufacturers of agricultural implements for use in the manufacture of such implements in their own factories.....Tons	.....	139,663	.....	.....	89,781	.....
Cream separators, and steel bowls for.....Tons	.....	455,337	.....	.....	208,855	.....
Cream separators—materials which enter into the construction and form part of, when imported by manufacturers of cream separators to be used in the manufacture thereof, and articles of metal for use in the manufacture of cream separator parts.....Tons	.....	236,958	.....	.....	246,313	.....
Ferro-manganese and spiegeleisen containing over 15 per cent manganese.....Tons	14,030	328,707	23.43	12,640	723,738	57.26
Gas buoys—The following articles and materials, when imported by manufacturers of automatic gas buoys and automatic gas beacons, for use in the manufacture of such buoys and beacons for the Government of Canada or for export, viz., iron or steel tubes over 16 in. in diameter; flanged and dished steel heads made from boiler plate, over 5 feet in diameter; hardened steel balls, not less than 3 in. in diameter; acetylene gas lanterns and parts thereof, and tin bronze in bars or rods.....Tons	.....	21,288	.....	.....	10,160	.....
Gun barrels, in single tubes, forged, rough, bored.....Tons	46.7	1,041	22.29	.....	.....	.....
Iron or steel rods over 1/4 in. in diameter for manufacturing of chain.....Tons	51,201.2	1,165,401	22.76	.....	.....	.....
Iron or steel, rolled round wire rods, in the coil, not over 1/4 in. in diameter, when imported by wire manufacturers for use in making wire in the coil in their own factories.....Tons	7,528.8	212,669	28.25	5,758.3	162,517	28.22
Boiler plate of iron or steel not less than 30 in. in width, and not less than 1/4 in. in thickness, for use exclusively in the manufacture of boilers.....Tons	23,203.8	1,372,577	59.15	7,022.5	446,538	63.59
Flat galvanized iron or steel sheets.....Tons	.....	.....	.....	.....	.....	.....
Iron and steel, and cast steel in bars, band, hoop, scroll or strip, sheet or plate of any size, thickness, or width; galvanized or coated with any material or not, and steel blanks for the manufacture of milling cutters, when of greater value than 3 cents per lb.....Tons	2,452.3	408,754	166.68	1,663.1	380,135	228.57
Roller iron or steel sheets in strips, polished or not, 14 gauge and thinner, n.o.p.....Tons	8,756.4	369,144	42.16	2,130.3	118,107	55.44
Roller iron or steel, hoop, band, scroll, or strip, No. 14 gauge or thinner, galvanized or coated with other metal or not, n.o.p.....Tons	549.0	23,254	42.35	144.5	9,334	64.60
Iron tubing, brass covered, not over 3 in. in diameter, and brass trimmings, not polished, lacquered or otherwise manufactured, when imported by manufacturers of iron or brass bedsteads, for use exclusively for the manufacture of such articles in their own factories.....Tons	.....	147,961	.....	.....	137,635	.....
Iron tubing, brass covered, not over 2 in. in diameter, in the rough where imported by manufacturers for use only in their own factories, in the manufacture of towel bars, bath tub rails and clothes carriers.....Tons	.....	512	.....	.....	82	.....
Iron tubing, lacquered or brass covered, not over 2 in. in diameter, brass covered rods and brass trimmings, when imported by manufacturers of carriage rails, for use exclusively in the manufacture of such articles in their own factories.....Tons	.....	1,813	.....	.....	4,604	.....
Iron tubing, lacquered or brass covered, for manufacture of extension rods for windows.....Tons	.....	3,761	.....	.....	5,756	.....
Iron or steel, beams, sheets, plates, angles, knees, masts or parts thereof and cable chains for wooden, iron, steel or composite ships or vessels.....Tons	14,884.3	405,908	27.27	12,102.7	352,894	29.16

Imports of Iron and Steel Goods Free of Duty—Continued.

Material.	CALENDAR YEAR, 1914.			CALENDAR YEAR, 1915.		
	Quantity.	Value.	Value per unit.	Quantity.	Value.	Value per unit.
Steel balls adapted for use on bearings on machinery and vehicles..... \$						
Steel, rolled, for saws and straw cutters, not tempered, or ground, nor further manu- factured than cut to shape without indented edges..... Tons	887.3	\$ 3,269	\$149.78	788.2	\$ 3,912	\$158.82
Steel strips and flat steel wire when imported into Canada by manufacturers of buck- thorn and plain strip fencing for use exclusively in their own factories in the manu- facture thereof..... \$						
Steel wire, Bessemer soft drawn spring of Nos. 10, 12, and 13 gauge, respectively, and homo steel spring wire of Nos. 11 and 12 gauge, respectively, when imported by manufacturers of wire mattresses, to be used exclusively in their own factories in the manufacture of such articles..... Tons	569.5	27,672	48.59	807	37,322	46.25
Steel, crucible sheet, 11 to 16 gauge, 24 in. to 18 in. wide for the manufacture of mower and reaper knives when imported by manufacturers thereof for use exclusively in the manufacture of such articles in their own factories..... "	501.0	37,895	75.64	278.4	19,904	71.49
Steel, No. 20 gauge and thinner, but not thinner than No. 30 gauge, for the manu- facture of corset steels, clock springs, and shoe shanks, imported by manufacturers of such articles for exclusive use in the manufacture of such articles in their own factories..... "	44.2	4,134	93.53	1.2	221	184.17
Steel wire, flat, of 16 gauge or thinner, imported by the manufacturers of crinoline, or corset wires and dress stays, for use exclusively in the manufacture of such articles in their own factories..... "	347.5	55,215	158.89	364.2	50,818	139.53
Steel, No. 12 gauge and thinner, but not thinner than No. 30 gauge, for the manufacture of buckle clasps, bed fasts, furniture casters, and ice-creepers, imported by the manufacturers of such articles, for use exclusively in the manufacture of such articles in their own factories..... "	104.2	5,159	49.51	102.9	5,539	53.83
Steel No. 24 and 17 gauge, in the sheets 63 in. long and from 18 in. to 32 in. wide, when imported by the manufacturers of tubular bow sockets for use exclusively in the manufacture of such articles in their own factories..... "	58.7	3,098	52.78	111.7	4,235	37.91
Steel springs for the manufacture of surgical trusses, when imported by manufacturers of surgical trusses for use exclusively in the manufacture thereof in their own factories..... "	0.3	197	656.67	0.3	264	880.00
Rolled iron, and rolled steel nail rods, under half an inch in diameter, for the manu- facture of horseshoe nails..... "	1,575.3	72,841	46.24	906.3	38,131	42.07
Tin plates and sheets..... "	50,791	3,151,385	62.05	45,164.8	2,883,951	63.85
Steel seamless tubing valued at not less than 3½ cents per pound..... "	39	7,438	190.72	9.8	1,807	184.39
Steel rolled or drawn gauge tubing adapted for use in the manufacture of agricultural implements..... \$						
Steel or iron tubes, rolled, not joined or welded, not more than 1½ in. in diameter, n.o.p. Seamless steel, or wrought iron boiler tubes, including flues and corrugated tubes for marine boilers..... Tons		37,256			21,654	
Barbed fencing wire of iron or steel..... "		706,675			310,880	
Wire crucible cast steel, valued at not less than 6 cents per pound..... "	17,001.3	662,814	38.99	11,499.6	526,347	45.77
Wire, curved or not, galvanized iron or steel, Nos. 9, 12, and 13 gauge..... "	12	3,142	261.83	8.7	2,116	243.22
Wire rope for use exclusively for rigging of ships and vessels..... "	35,39.5	1,223,600	34.62	32,631.7	1,233,572	37.80
Wire, steel, valued at not less than 2½ cents per pound when imported by manufacturers of rope for use exclusively in the manufacture of rope..... "	3,026.1	237,299	78.42	1,191.1	110,537	92.80
Total.....		15,162,193			11,466,812	

A very large proportion of these imports is derived from the United States, and a record has been compiled from the "Commerce and Navigation of the United States" report, showing the exports of iron and steel goods from that country to Canada.

According to this authority there were exported to Canada from the United States during the twelve months ending June 30, 1915, 596,323 tons of iron and steel goods, valued at \$19,697,148, together with other iron and steel goods of which the weight is not given, valued at \$28,713,872, or a total value of \$48,411,020.

During the twelve months ending June 30, 1914, the corresponding exports to Canada were 1,169,349 tons of iron and steel goods, valued at \$35,921,812, together with other iron and steel goods of which the weight is not given valued at \$40,780,471, or a total value of \$76,702,283.

During the twelve months ending June 30, 1913, exports to Canada were 1,695,916 tons of iron and steel goods, valued at \$51,936,616, together with other iron and steel goods of which the weight is not given, valued at \$54,673,774, or a total value of \$106,610,390.

During the twelve months ending June 30, 1912, exports to Canada were 1,175,464 tons, valued at \$36,637,305, together with other iron and steel goods, valued at \$46,020,989, or a total value of \$82,658,294.

Exports of Iron and Steel to Canada from the United States.

Material.	TWELVE MONTHS ENDING JUNE, 1913.				TWELVE MONTHS ENDING JUNE, 1914.				TWELVE MONTHS ENDING JUNE, 1915.			
	Quantity.	Value.	Average.	Quantity.	Value.	Average.	Quantity.	Value.	Quantity.	Value.	Average.	Average.
Bar iron.....	11,773-8	\$429,181	\$36.45	6,544-2	\$ 308,248	\$47.10	2,393-0	\$81,766	2,393-0	\$81,766	\$34.17	\$34.17
Bars or rods of steel—												
Wire rods.....	82,474-3	2,134,198	25.88	63,108-3	1,617,939	25.64	40,961-9	937,836	40,961-9	937,836	22.90	22.90
All other.....	124,761-2	3,021,171	24.23	92,701-8	3,010,274	32.54	67,146-9	2,111,439	67,146-9	2,111,439	31.43	31.43
Billets, ingots, and blooms of steel.....	184,068-9	1,865,571	21.00	24,243-5	487,089	20.93	18,426-2	394,546	18,426-2	394,546	21.43	21.43
Bolts, nuts, rivets and washers.....	3,220-3	1,918,803	21.05	2,105-4	351,062	49.55	1,229-2	50,572	1,229-2	50,572	21.08	21.08
Hoops, band and scroll.....	9,436-3	370,561	39.91	9,152-4	376,949	41.17	7,114-9	299,068	7,114-9	299,068	42.72	42.72
Hoists and pulleys.....	271-1	24,894	91.83	248-8	22,941	92.21	196-9	20,425	196-9	20,425	103.73	103.73
Nails and spikes—												
Cut.....	8-3	488	58.80	21-3	932	43.76	.....	.....	.....	.....	.....	.....
Railroad spikes.....	6,218-4	224,193	36.05	3,543-2	121,090	34.13	1,353-0	42,102	1,353-0	42,102	30.73	30.73
Wire.....	2,662-4	106,693	40.10	1,342-3	63,040	46.22	1,054-8	52,069	1,054-8	52,069	51.05	51.05
All other, including tacks.....	248,840-1	3,124,550	12.56	140,510-7	1,782,862	12.69	43,176-0	602,058	43,176-0	602,058	13.94	13.94
Pipes and fittings—												
Cast.....	{ (a) 78,618-7	4,175,057	53.11	{ (a) 52,674-8	2,732,573	51.88	{ 11,770-1	532,600	{ 11,770-1	532,600	45.22	45.22
Wrought.....	{ 8,989-5	653,182	72.66	{ 5,722-7	401,980	70.24	{ 14,980-1	862,476	{ 14,980-1	862,476	57.57	57.57
Radiators and cast-iron heating boilers.....	{ 155,051-7	3,980,657	25.67	{ 129,545-9	3,415,167	26.36	{ 230,111	182,540	{ 230,111	182,540	69.07	69.07
Scrap and old fit only for remanufacture.....	{ 84,523-0	1,032,971	12.22	{ 49,570-0	577,917	11.66	{ 9,962-4	114,542	{ 9,962-4	114,542	11.50	11.50
Sheets and plates.....	{ 41,505-6	2,428,687	58.51	{ 26,827-5	1,595,003	59.45	{ 24,779-9	1,471,841	{ 24,779-9	1,471,841	59.40	59.40
Iron, all other.....	{ 15,568-1	692,434	44.48	{ 9,763-2	434,523	44.31	{ 6,169-1	280,524	{ 6,169-1	280,524	45.47	45.47
Steel plates.....	{ 220,528-7	6,706,433	30.41	{ 141,842-1	4,245,763	29.93	{ 77,580-4	2,553,580	{ 77,580-4	2,553,580	29.05	29.05
Steel sheets.....	{ 120,309-0	3,916,764	32.56	{ 97,516-2	3,014,796	30.93	{ 66,360-2	1,922,088	{ 66,360-2	1,922,088	28.96	28.96
Structural iron and steel.....	{ 269,250-2	9,242,288	34.33	{ 224,666-4	6,990,022	31.01	{ 94,545-9	2,535,404	{ 94,545-9	2,535,404	26.82	26.82
Tin plates,terne plates, and tangers tin.....	{ 58,289-2	4,065,672	69.75	{ 36,582-3	2,513,867	68.72	{ 38,299-5	2,445,529	{ 38,299-5	2,445,529	63.85	63.85
Wire and manufactures of—												
Wire, barbed.....	{ 16,094-8	656,185	40.77	{ 12,688-9	508,337	40.06	{ 15,027-9	603,083	{ 15,027-9	603,083	40.13	40.13
Wire, all other.....	{ 49,318-8	1,912,069	38.77	{ 37,436-5	1,476,297	39.43	{ 42,319-3	1,611,454	{ 42,319-3	1,611,454	38.08	38.08
1,695,916-0	51,936,616	30.62	1,169,349-3	35,921,812	30.72	596,323-4	19,697,148	33.03				
Builders' hardware and tools—												
Locks.....	.....	479,985	.....	.....	303,601	.....	.....	180,917	.....	180,917	.....	.....
Hinges, and other builders' hardware.....	.....	1,712,768	.....	.....	1,365,987	.....	.....	1,065,804	.....	1,065,804	.....	.....
Car wheels.....	14,640	107,300	7.33	11,696	108,174	9.25	3,976	13,600	3,976	13,600	13.60	13.60
Castings, not elsewhere specified.....	.....	1,656,680	.....	.....	1,626,211	.....	.....	692,678	.....	692,678	.....	.....

Exports of Iron and Steel to Canada from the United States.—Continued.

Material.	TWELVE MONTHS ENDING JUNE, 1913.			TWELVE MONTHS ENDING JUNE, 1914.			TWELVE MONTHS ENDING JUNE, 1915.		
	Quantity.	Value.	Average.	Quantity.	Value.	Average.	Quantity.	Value.	Average.
Woodworking machinery, sawmill machinery.....	\$	439,173			\$	221,283		\$	171,678
Woodworking machinery, all other		477,345				511,400			177,877
All other, and parts of.....		10,872,249				10,095,534			7,297,541
Railway track material (except rails and spikes) such as switches, frogs, fish-plates, splice-bars, etc.....		732,617				793,134			260,981
Saws.....	3,403	208,277	61.20			135,612			57,469
Scutes, and balances.....		158,349		3,070		134,191	1,571		80,265
Staves, ranges and parts of.....		1,314,725				975,460			450,837
Tools not elsewhere specified—									
Axes.....	83,122	44,526							
Hammers and hatchets.....		74,947	54	70,548		38,493	20,183		11,288
Saws.....		346,887				38,979			12,843
Shovels and spades.....		23,099				234,721			142,507
All other.....		1,866,713				14,087			19,067
Wire manufactures—woven wire fencing		114,395				1,371,832			925,052
Wire manufactures—all others.....		430,288				93,370			112,226
All other manufactures of steel.....		7,877,122				365,327			333,556
						7,375,163			5,667,959
		54,673,774				40,780,471			28,713,872
Total value.....		106,610,390				76,702,283			48,411,020

* Compiled from Commerce and Navigation of the United States, Washington, D.C.

(a) Not separately stated.

(b) Included in all other machinery and parts of.

LEAD.

The production of lead in Canada in 1915 amounted to 46,316,450 pounds, valued at \$2,593,721 as compared with 36,337,765 pounds, valued at \$1,627,568 in 1914, being an increase in production of 27.4 per cent, and in value of 56.3 per cent.

The statistics of lead production since 1909 as given in the accompanying table represent the quantity of refined lead produced in Canada from domestic ores, together with a small quantity of lead contained in lead ores exported. The production has been mainly from British Columbia with occasionally small amounts from other provinces and the Yukon Territory. Statistics showing the annual production of lead in Canada since 1887 are shown in the following table:—

Annual Production of Lead.

Year.	Pounds.	Cents per pound.	Value.	Year.	Pounds.	Cents per pound.	Value.
1887.....	204,800	5.400	\$ 9,216	1901.....	51,900,958	4.334	\$2,249,387
1888.....	674,500	4.420	29,812	1902.....	22,956,381	4.069	934,095
1889.....	165,100	3.930	6,488	1903.....	18,139,283	4.237	768,562
1890.....	105,000	4.480	4,704	1904.....	37,531,244	4.309	1,617,221
1891.....	88,665	4.350	3,857	1905.....	56,864,915	4.707	2,676,632
1892.....	808,420	4.090	33,064	1906.....	54,608,217	5.657	3,089,187
1893.....	2,135,023	3.730	79,636	1907.....	47,738,703	5.325	2,542,086
1894.....	5,703,222	3.290	187,636	1908.....	43,195,733	4.200	1,814,221
1895.....	16,461,794	3.230	531,716	1909.....	45,857,424	*3.690	1,692,139
1896.....	24,199,977	2.980	721,159	1910.....	32,987,508	*3.687	1,216,249
1897.....	39,018,219	3.580	1,396,853	1911.....	23,784,969	†3.480	827,717
1898.....	31,915,319	3.780	1,206,399	1912.....	35,763,476	†4.467	1,597,554
1899.....	21,862,436	4.470	977,250	1913.....	37,662,703	†4.659	1,754,705
1900.....	63,169,821	4.370	2,760,521	1914.....	36,337,765	†4.479	1,627,568
				1915.....	46,316,450	†5.600	2,593,721

*In 1909 and 1910, average prices at Toronto as quoted by *Hardware and Metal*, in previous years average prices at New York, as quoted by *Engineering and Mining Journal*.

†Average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co., Montreal, Que.

For a number of years there has been a very wide divergence between the record of lead recovery and the statements of lead contained in ores shipped from the mines. While the difference is due in part to smelter losses there was also, during 1912 and 1913 especially, a considerable accumulation of lead ores at the Trail smelter. In 1915, however, the recovery of lead was but little less than that contained in ores shipped from mines apparently indicating a reduction in stocks of ores at the smelter.

The shipment of lead ores from mines and the metallic contents thereof, as reported by the mine operators, have been, during the past four years, as follows:—

Ores Shipped and Metal Contents.

Year.	Lead ores shipped in tons.	Lead contents in pounds.	Silver contents in ounces.
1912.....	59,814	45,896,537	2,366,294
1913.....	85,978	53,807,570	2,564,155
1914.....	70,207	50,527,130	2,501,820
1915.....	88,647	48,708,005	2,954,175

Previous to 1904 lead ores mined in Canada were either exported as ore or smelted in Canadian furnaces and exported in the form of base bullion to be refined abroad. A lead refinery employing the Betts electrolytic process has been in operation at Trail, B.C., since 1904 treating the base bullion produced by the lead blast furnaces.

The North American Smelting Company erected a plant at Kingston, Ontario, which started operations during the latter part of 1912, treating scrap and lead dross as well as ores from the United States, British Columbia, and Ontario. This plant closed down November 1, 1913, and has not since resumed operations.

The total production of refined lead, from all sources, has been as follows:—

Refined Lead Produced.

Year.	Pounds of refined lead produced.	Year.	Pounds of refined lead produced.	Year.	Pounds of refined lead produced.
1904.....	7,519,440	1908.....	36,549,274	1912.....	37,008,490
1905.....	15,804,509	1909.....	41,883,614	1913.....	39,663,766
1906.....	20,471,314	1910.....	32,987,508	1914.....	36,443,706
1907.....	26,607,461	1911.....	23,525,050	1915.....	43,518,618

Prices.—The average price for soft lead in 1915 on the London market was £22 17s. 10d., as compared with £18 13s. 9d. in 1914.

The price of lead at Montreal, the main Canadian market was higher in 1915, as well as in 1914 and 1913, than the New York and London values. The average price of lead at Montreal in 1915 was 5.600 cents per pound, as against 4.979 in London, 4.673 in New York, and 4.567 in St. Louis.

The Toronto price in winter is about the same as that at Montreal but the latter falls during the period of summer freight rates, about 10 cents per 100 pounds below the former.

The yearly and monthly average prices of lead in Montreal, London, and New York, for the last few years are given in the following tables:—

Lead Prices.

Yearly Average Prices of Lead in Montreal, London, New York, and St. Louis.

(Values in cents per pound.)

	1909.	1910.	1911.	1912.	1913.	1914.	1915.
Montreal.....	3.268	3.246	3.480	4.467	4.659	4.479	5.600
London.....	2.803	2.775	2.992	3.921	4.072	4.146	4.979
New York.....	4.273	4.446	4.420	4.471	4.370	3.862	4.673
St. Louis.....	4.133	4.312	4.286	4.360	4.238	3.737	4.567

Monthly Average Prices of Pig Lead at Montreal.*

(Values in cents per pound.)

Month.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
January.....	3.35	3.48	3.31	3.93	4.32	4.78	4.27
February.....	3.38	3.40	3.32	3.97	4.18	4.73	4.58
March.....	3.42	3.34	3.34	4.03	4.05	4.57	5.04
April.....	3.35	3.21	3.26	4.10	4.42	4.41	5.21
May.....	3.26	3.13	3.20	4.08	4.66	4.54	5.26
June.....	3.23	3.15	3.27	4.34	4.98	4.55	6.53
July.....	3.12	3.13	3.33	4.57	4.93	4.49	6.35
August.....	3.08	3.11	3.45	4.84	5.02	4.48	5.62
September.....	3.14	3.11	3.63	5.47	5.02	4.42	5.63
October.....	3.26	3.23	3.77	5.07	4.99	4.07	5.71
November.....	3.28	3.31	3.93	4.53	4.82	4.29	6.39
December.....	3.34	3.35	3.95	4.55	4.62	4.41	6.61
Average.....	3.268	3.246	3.480	4.467	4.659	4.479	5.600

*Producers' prices for car-load quantities ex-cars Montreal as furnished by Messrs. Thos. Robertson Co., Ltd., of Montreal.

Monthly Average Prices of Lead in New York.†

(Values in cents per pound.)

Month.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
January.....	4.552	5.600	6.000	3.691	4.175	4.700	4.483	4.435	4.321	4.111	3.729
February.....	4.450	5.464	6.000	3.725	4.018	4.613	4.440	4.026	4.325	4.048	3.827
March.....	4.470	5.350	6.000	3.838	3.986	4.459	4.394	4.073	4.327	3.970	4.053
April.....	4.500	5.404	6.000	3.993	4.168	4.376	4.412	4.200	4.381	3.810	4.221
May.....	4.500	5.685	6.000	4.253	4.287	4.315	4.373	4.194	4.342	3.900	4.274
June.....	4.500	5.750	5.760	4.466	4.350	4.343	4.435	4.392	4.325	3.900	5.932
July.....	4.524	5.750	5.288	4.447	4.321	4.404	4.499	4.720	4.353	3.891	5.659
August.....	4.665	5.750	5.250	4.580	4.363	4.400	4.500	4.569	4.624	3.875	4.656
September.....	4.850	5.750	4.813	4.515	4.342	4.400	4.485	5.048	4.698	3.828	4.610
October.....	4.850	5.750	4.750	4.351	4.341	4.400	4.265	5.071	4.402	3.528	4.600
November.....	5.200	5.750	4.376	4.330	4.370	4.442	4.298	4.615	4.293	3.683	5.155
December.....	5.422	5.900	3.658	4.213	4.560	4.500	4.450	4.303	4.047	3.800	5.355
Average.....	4.707	5.657	5.325	4.200	4.273	4.446	4.420	4.471	4.370	3.862	4.673

† From the *Engineering and Mining Journal*.

Average Monthly Prices of Lead in London.†

(In £ Sterling per ton of 2,240 pounds.)

Month.	1906.	1907.	1908.	1909.	1910.
January.....	16 17 6	19 16 0	14 10 6	13 3 6	13 3 11
February.....	16 0 4	19 11 8	14 5 6	13 5 5	13 7 3
March.....	15 17 9	19 14 6	14 1 4	13 8 8½	13 2 9
April.....	15 16 6	19 16 7	13 13 10	13 7 0	12 13 9
May.....	16 13 6	19 17 7	13 2 7	13 5 3	12 11 8
June.....	16 15 6	20 6 0	12 15 7	13 2 4	12 13 9
July.....	16 11 7	20 8 2	12 19 6	12 13 3	12 11 8
August.....	17 1 3	19 0 3	13 9 10½	12 10 6	12 10 10
September.....	18 4 4	19 17 6	13 3 6	12 15 3	12 12 6
October.....	19 7 9	18 13 0	13 7 3	13 4 4	13 2 0
November.....	19 5 6	17 4 11	13 12 2	13 1 4½	13 4 6
December.....	19 12 6	14 9 4	13 3 6	13 2 11½	13 3 9
Yearly average.....	17 7 0	19 1 10	13 10 5	13 1 8	12 19 0

Month.	1911.	1912.	1913.	1914.	1915.
January.....	13 0 8	15 11 3	17 1 11	18 19 10	18 12 0
February.....	13 1 11	15 13 9	16 8 5	19 2 8	19 3 7
March.....	13 2 11	15 19 8	15 19 8	19 2 3	21 17 8
April.....	12 18 5	16 6 6	17 8 10	17 19 8	21 2 1
May.....	12 19 2	16 10 2	18 14 3	18 4 8	20 9 2
June.....	13 5 5	17 11 8	19 10 8	18 13 11	25 4 1
July.....	13 10 11	18 8 9	19 7 10	18 8 6	24 12 3
August.....	14 1 4	19 5 8	19 15 8	20 9 9	21 18 11
September.....	14 15 1	21 9 0	19 14 10	18 16 3	23 3 0
October.....	15 6 1	20 8 0	19 9 5	17 9 8	23 19 9
November.....	15 15 5	18 4 7	18 13 9	17 19 9	26 2 9
December.....	15 13 4	18 1 6	17 8 8	18 18 6	28 8 8
Yearly average.....	13 19 3	17 15 11	18 6 2	18 13 9	22 17 10

† From the *Metal Bulletin*, published in London.

Exports and Imports.—The exports of lead in 1915 amounted to 3,912,029 pounds, valued at \$119,340, as against 756,673 pounds valued at \$22,188 in 1914, and consisted in 1915 of pig lead 2,066,929 pounds, valued at \$79,067, and lead in ore, concentrates, etc., 1,845,100 pounds, valued at \$40,273.

The total exports of lead since 1873 and the detail of these exports for the last few years are given in the following tables:—

Exports of Lead, 1910 to 1915.

	LEAD IN ORE, CONCENTRATES, ETC.		PIG LEAD.	
	Pounds.	Value.	Pounds.	Value.
1910—To United States.....	46,800	\$ 1,308	59,605	\$ 2,295
" " Other countries.....			7,652,648	245,879
1911— " United States.....	65,100	1,826	71,961	2,806
1912— " " ".....	299,240	8,193		
1913— " " ".....	329,960	9,136		
1914— " " ".....	246,100	2,681	510,573	19,507
1915— " " ".....	1,845,100	40,273	47,540	1,494
" Newfoundland.....			1,600	40
" Other countries.....			2,017,789	77,533
Total for 1915.....	1,845,100	40,273	2,066,929	79,067

Exports of Lead, 1873 to 1915.

Year.	Pounds.	Value.	Year.	Pounds.	Value.	Year.	Pounds.	Value.
1873.....		\$1,993	1888.....		\$ 18	1903...	18,624,303	\$ 426,466
1874.....		127	1889.....		18	1904...	25,868,823	559,461
1875.....		7,510	1890.....			1905...	41,657,403	1,046,541
1876.....		66	1891.....		5,000	1906...	21,436,022	736,007
1877.....		720	1892.....		2,509	1907...	25,591,883	1,029,898
1878.....			1893.....		3,099	1908...	18,454,594	622,454
1879.....		230	1894.....	5,792,700	144,509	1909...	17,528,028	493,642
1880.....			1895.....	23,075,892	435,071	1910...	7,759,053	249,482
1881.....			1896.....	26,480,320	462,095	1911...	137,061	4,632
1882.....		32	1897.....	43,802,697	925,144	1912...	299,240	8,193
1883.....		5	1898.....	37,375,678	885,485	1913...	329,960	9,136
1884.....		36	1899.....	15,799,518	466,950	1914...	756,673	22,188
1885.....			1900.....	57,642,029	1,917,690	1915...	3,912,029	119,340
1886.....			1901.....	45,590,995	1,804,687			
1887.....		724	1902.....	17,761,484	457,170			

The imports of lead in 1915 were 24,369 tons, valued at \$2,482,916, as against 10,924 tons, valued at \$1,042,538 in 1915. There was included herein certain manufactures of lead valued at \$102,439 in 1915, and \$99,285 in 1914, for which no equivalent quantity is given.

The imports of lead during 1913, 1914, and 1915, with the details of the annual imports of lead in pigs, bars, sheets, etc., since 1880, and the imports of lead manufactures, etc., are given in the following tables:—

Imports of Lead 1913, 1914, and 1915.

	1913.		1914.		1915.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Old scrap, pig and block.....	5,600	\$ 464,117	7,722	\$ 590,557	21,308	\$2,010,006
Bars and sheets.....	747	62,527	481	41,244	456	56,331
Pipe.....	233	21,679	283	26,282	73	8,708
Shot and bullets.....	215	19,582	90	10,542	543	51,890
Manufactures of lead.....		155,178		99,285	(a) 102,439	
Tea lead.....	1,737	217,009	844	108,097	480	67,652
Litharge.....	500	50,734	543	52,525	790	89,232
Total.....	9,032	990,826	9,963	928,532	23,650	2,386,258
Metallic lead contained in imported lead pigments.....	1,852	224,607	961	114,006	719	96,658
	10,884	1,215,433	10,924	1,042,538	24,369	2,482,916

(a) Includes nitrate and acetate of lead in 1915.

Imports of Lead in Pigs, Bars, Sheets, etc.

Fiscal Year.	OLD, SCRAP, AND FIG.		Average price.	BARS, BLOCKS, SHEETS.		Average price.	TOTAL.	
	Cwt.	Value.		Cwt.	Value.		Cwt.	Value.
1880.....							30,298	\$124,117
1881.....	16,236	\$ 56,919	\$3.51	18,222	\$70,744	\$3.88	34,458	127,663
1882.....	36,655	120,870	3.30	10,540	35,728	3.39	47,195	156,598
1883.....	48,680	148,759	3.06	8,591	28,785	3.35	57,371	177,544
1884.....	39,409	103,413	2.62	9,704	28,458	2.93	49,113	131,871
1885.....	36,106	87,038	2.41	9,362	24,396	2.61	45,468	111,434
1886.....	39,945	110,947	2.78	9,793	28,948	2.96	49,738	139,895
1887.....	61,160	173,477	2.84	14,153	41,746	2.95	75,313	215,223
1888.....	68,678	196,845	2.87	14,957	45,900	3.06	83,635	242,745
1889.....	74,223	213,132	2.87	14,173	43,482	3.07	88,396	256,614
1890.....	101,197	283,096	2.80	19,083	59,484	3.12	120,280	342,580
1891.....	86,382	243,033	2.81	15,646	48,220	3.08	102,028	291,253
1892.....	97,375	254,384	2.61	11,299	32,368	2.86	108,674	286,752
1893.....	94,485	215,521	2.28	12,403	32,286	2.60	106,888	247,807
1894.....	70,223	149,440	2.13	8,486	20,451	2.41	78,709	169,891
1895.....	67,261	139,290	2.07	6,739	16,315	2.42	74,000	155,605
1896.....	72,433	173,162	2.39	8,575	23,169	2.70	81,008	196,331
1897.....	65,279	158,381	2.43	10,516	29,175	2.77	75,795	187,556
	OLD, SCRAP, FIG, AND BLOCK.*			BARS, AND SHEETS.†			TOTAL.	
1898.....	88,420	260,779	2.95	22,214	39,041	1.76	110,634	299,820
1899.....	114,659	283,432	2.47	44,796	39,833	0.89	159,455	323,265
1900.....	62,361	207,819	3.33	15,493	53,506	3.45	77,854	251,325
1901.....	(a) 85,321	97,011	1.14	16,295	78,316	4.81	101,616	175,327
1902.....	(a) 122,279	104,672	0.86	18,596	49,261	2.65	140,875	153,933
1903.....	(a) 98,530	67,821	0.69	11,535	35,398	3.07	110,065	103,219
1904.....	(a) 94,602	121,165	1.28	14,102	39,644	2.81	108,704	160,809
1905.....	(a) 57,074	133,775	2.34	17,792	51,972	2.92	74,866	185,747
1906.....	82,729	271,105	3.28	16,106	57,185	3.55	98,835	328,290
Calendar Year.								
1907.....	79,673	363,655	4.56	19,177	86,338	4.50	98,850	449,993
1908.....	49,825	155,513	3.12	14,402	49,527	3.44	64,227	205,040
1909.....	112,980	184,572	1.63	13,412	44,071	3.29	126,392	228,645
1910.....	120,591	346,516	2.87	17,697	45,674	2.58	138,288	392,190
1911.....	199,774	495,923	2.48	30,837	55,458	1.80	230,611	551,381
1912.....	281,787	940,583	3.34	19,212	93,702	4.88	300,999	1,034,285
1913.....	111,995	464,117	4.14	14,944	62,527	4.18	126,939	526,644
1914.....	154,441	590,557	3.82	9,615	41,244	4.29	164,056	631,801
1915.....	426,162	2,010,006	4.72	9,125	56,331	6.17	435,287	2,066,337

*Duty 15 per cent.

†Duty 25 per cent.

(a) Includes Canadian lead ore sent to the United States for refining, imported at price of refining only.

Imports of Lead Manufactures.

Calendar Year.	Pipe Lead.		Shot and Bullets.		Tea Lead.		Other manufactures of lead.
	Pounds.	Value.	Pounds	Value.	Pounds.	Value.	
1910.....	403,012	\$15,365	6,903	\$ 311	2,371,136	\$117,399	\$107,688
1911.....	512,737	19,426	8,912	1,053	2,688,211	134,160	108,012
1912.....	688,383	32,423	477,047	23,163	3,212,861	167,716	144,571
1913.....	466,753	21,679	429,656	19,582	3,475,171	217,009	155,178
1914.....	565,762	26,282	180,639	10,542	1,687,029	108,097	99,285
1915.....	145,953	8,708	1,085,196	51,890	959,189	67,652	102,439

Imports of Litharge.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880.....	3,041	\$14,334	1893....	7,685	\$24,401	1906....	10,165	\$ 39,836
1881.....	6,126	22,129	1894....	38,547	28,685	Calendar		
1882.....	4,900	16,651	1895....	11,955	32,953	Year:—		
1883.....	1,532	6,173	1896....	10,710	32,817	1907....	17,546	85,557
1884.....	5,235	18,132	1897....	12,028	34,538	1908....	15,524	57,929
1885.....	4,900	16,156	1898....	10,446	32,904	1909....	17,049	58,100
1886.....	4,928	16,003	1899....	9,530	32,518	1910....	15,541	56,049
1887.....	6,397	21,865	1900....	9,139	29,176	1911....	17,979	65,743
1888.....	7,010	23,808	1901....	11,132	51,944	1912....	25,925	113,941
1889.....	8,089	31,082	1902....	13,002	47,021	1913....	10,009	50,734
1890.....	9,453	31,401	1903....	13,921	47,761	1914....	10,863	52,525
1891.....	7,979	27,613	1904....	9,894	32,633	1915....	15,798	89,232
1892.....	10,384	34,343	1905....	17,865	57,736			

Imports of Dry White and Red Lead and Orange Mineral, and White Lead Ground in Oil.

Fiscal Year	Pounds.	Value.	Cents per pound.	Fiscal Year.	Pounds.	Value.	Cents per pound.
1885.....	5,540,753	\$198,913	3·69	1896.....	11,711,496	\$367,569	3·14
1886.....	6,703,077	213,258	3·18	1897.....	10,310,463	347,539	3·37
1887.....	6,998,820	233,725	3·34	1898.....	12,682,808	448,659	3·54
1888.....	6,361,334	216,654	3·41	1899.....	14,507,945	514,842	3·55
1889.....	7,066,465	267,236	3·78	1900.....	14,679,920	634,492	4·32
1890.....	10,859,672	381,959	3·52	1901.....	10,241,601	461,368	4·50
1891.....	8,560,615	337,407	3·94	1902.....	15,584,164	603,582	3·87
1892.....	10,288,766	351,686	3·42	1903.....	19,208,786	758,371	3·95
1893.....	10,865,183	364,680	3·36	1904.....	16,925,585	662,098	3·91
1894.....	10,958,170	353,053	3·22	1905.....	17,376,588	638,381	3·67
1895.....	8,780,052	282,353	3·22	1906.....	10,412,891	417,444	4·01

Calendar Year.	DRY WHITE LEAD.		DRY RED LEAD.		DRY RED LEAD AND ORANGE MINERAL.		TOTAL IMPORTS.		Cents per pound.
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
1907.....	7,560,185	\$403,941	512,473	\$29,063	443,905	\$ 30,203	8,516,563	\$463,207	5·44
1908.....	2,913,799	119,860	415,606	18,429	638,518	25,367	3,967,923	163,656	4·12
1909.....	2,690,575	95,894	730,001	32,678	516,032	25,341	3,936,608	153,913	3·91
1910.....	2,076,629	75,463	811,510	37,475	881,788	31,803	3,769,927	144,741	3·84
1911.....	1,467,193	58,335	1,033,732	46,986	1,571,508	64,180	4,072,433	169,501	4·16
1912.....	2,499,725	138,627	714,362	37,916	2,539,767	113,579	5,753,854	290,122	5·04
1913.....	1,162,082	61,424	1,057,683	59,444	2,389,460	103,739	4,609,225	224,607	4·87
1914.....	363,136	20,279	546,961	31,654	1,451,264	62,073	2,361,361	114,006	4·83
1915.....	448,920	23,393	169,095	9,590	1,091,120	63,675	1,709,135	96,658	5·66

The production of lead, as already shown, was in 1915, 23,158 tons, while the exports were 1,956 tons, leaving a balance of 21,202 tons, which amount added to the 24,369 tons of imports and the manufactures, gives a total consumption of over 46,000 tons of lead, as against 29,000 tons in 1914, an increase of about 59 per cent.

The estimated consumption in 1913 was 30,000 tons; 39,000 tons in 1912; 28,000 tons in 1911, and 28,000 tons in 1910.

British Columbia.

The production of refined lead together with lead in ores exported amounted in 1915 to 45,377,064 pounds, valued at \$2,541,116, as against 36,289,845 pounds, valued at \$1,625,422 in 1914, an increase of 25 per cent.

According to the Provincial Department of Mines, 46,503,590 pounds of lead were contained in the lead ores shipped to the smelters for which returns had been received during 1915.

Almost all of the lead ore mined in British Columbia is smelted and refined at Trail, B.C. In 1915, however, the Surprise mine shipped its total output amounting to a considerable tonnage to the United States.

The record given in the following table for the years 1909 to 1914 inclusive represents the recovery of lead at smelter or refinery as distinguished from the figures given for the same years in the table next succeeding, which indicate the quantities of lead contained in ore sent to the smelters:—

British Columbia: Production of Lead.

Year	Pounds.	Value.	Cents per pound.	Year.	Pounds.	Value.	Cents per pound.
1887.....	204,800	\$ 9,216	4·40	1901.....	51,582,906	\$2,235,603	4·334
1888.....	674,500	29,813	4·42	1902.....	22,536,381	917,005	4·069
1889.....	165,100	6,488	3·93	1903.....	18,089,283	766,443	4·237
1890.....	Nil.	.....	.....	1904.....	36,646,244	1,579,086	4·309
1891.....	Nil.	.....	.....	1905.....	56,580,703	2,663,254	4·707
1892.....	808,420	33,064	4·09	1906.....	52,408,217	2,964,733	5·657
1893.....	2,131,092	79,490	3·73	1907.....	47,738,703	2,542,086	5·325
1894.....	5,703,222	187,636	3·29	1908.....	43,195,733	1,814,221	4·200
1895.....	16,461,794	531,716	3·23	1909.....	45,857,424	1,692,139	*3·690
1896.....	24,199,977	721,159	2·98	1910.....	32,987,508	1,216,249	*3·687
1897.....	38,841,135	1,390,513	3·58	1911.....	23,784,969	827,717	†3·480
1898.....	31,693,559	1,198,017	3·78	1912.....	35,763,476	1,597,554	†4·467
1899.....	21,862,436	977,250	4·47	1913.....	37,626,899	1,753,037	†4·659
1900.....	62,158,621	2,760,031	4·37	1914.....	36,289,845	1,625,422	†4·479
				1915.....	45,377,064	2,541,116	†5·600

*Average prices at Toronto for years 1909 and 1910. For previous years average prices at New York.

†Average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co., Montreal, Que.

British Columbia: Production of Lead by Districts.*

(Lead contained in Ore shipped from Mines, in pounds.)

District.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
Cassiar—Skeena, etc.....		1,695	238,578	41,512	6,579	.....	30,462
East Kootenay—							
Fort Steele.....	27,004,528	23,874,562	17,158,069	18,238,238	18,525,083	24,863,105	26,582,050
Other districts.....	18,724	66,010	.....	2,249,237	2,495,355	.....	216,327
West Kootenay—							
Ainsworth.....	10,298,343	2,558,353	289,009	4,863,894	9,027,861	8,069,525	3,436,184
Nelson.....	1,097,069	1,245,844	1,928,836	2,293,000	1,936,418	2,004,436	967,775
Slocan.....	4,976,199	6,406,358	6,705,571	16,944,811	22,648,766	15,233,910	14,925,345
Other districts.....	979,916	470,241	522,615	240,762	521,771	128,912	89,041
Yale—Grand Forks, etc..	21,567	35,683	29,719	.....	45,982	1,678	7,127
Cariboo—							
Omineca.....					156,862	323,482	249,279
	44,396,346	34,658,746	26,872,397	44,871,454	55,364,677	50,625,048	46,503,590

*From the Report of the Minister of Mines, B.C.

It will be noticed from the preceding table, that the Fort Steele district produced about 57 per cent of the total, Ainsworth 7 per cent, and Slocan 32 per cent.

Yukon.

During the last few years several properties have been developed and have shipped occasionally, but they have been handicapped by the high cost of development and supplies and by the heavy transportation charges.

The most important operations being conducted during 1915 were in what is known as the "Mayo area," north of the Stewart river. About 1,000 tons of very rich silver-lead ore were shipped from the Silver King property on Galena creek to the Selby smelter at San Francisco. This area is one of the most important placer gold producing districts of Yukon Territory but valuable lode deposits have also been discovered.

Dr. Cairnes of the Geological Survey reports¹ that: "The lode deposits that have been discovered within Mayo area, include mainly a rich silver-lead vein on Galena creek, and a number of gold-bearing veins on Dublin gulch. Other veins are known to occur carrying gold, silver, lead, and zinc minerals; but in most cases they have not been at all developed, and very little is known concerning them. Also on Hight creek and elsewhere, scheelite is frequently obtained in the concentrates in placer mining, indicating that deposits of this mineral occur in the vicinity. As scheelite and other tungsten ores have taken on increased value and importance since the outbreak of the war, careful search should be prosecuted for deposits in which they occur.

"The Galena creek vein is believed to have been discovered and staked by H. W. McWhorter and partner about the year 1906, but the claim was afterwards allowed to lapse. The deposit was relocated in 1912 or 1913 by Mr. McWhorter who gave a lay on the ground to Jack Alverson and Grant Hoffman. These layees did the first real development on the property, and proved it to be of importance. They shipped 59 tons of ore to the smelter at Trail, B.C., the smelter returns for which amounted to \$269 per ton, in gold, silver, and lead, the gold being very low, but the lead amounting to 45 per cent. In the spring of 1914 the property was acquired by Thomas P. Aitken and Henry Munroe, Mr. Aitken being the principal owner. During the winter of 1914-15 these owners shipped 1,180 tons of ore to San Francisco. The smelter returns for this shipment, according to a statement kindly furnished by Mr. Aitken, included \$3 per ton in gold, and for about half of the ore, 39 per cent lead and 280 ounces of silver, and for the other half 23 per cent lead and 260 ounces of silver per ton.

"The cost of freighting the ore to Mayo over the snow in winter has been about \$20 per ton; from Mayo to San Francisco the freight charges

¹ Summary Report, Geological Survey of Canada, 1915, pp. 27, 28.

amounted to approximately \$22 per ton; and the cost of treatment there was about \$20 per ton, a total of possibly slightly over \$62 per ton for freight and treatment."

Bounties.—In 1901, and again in 1903, the Dominion Government, to encourage the lead industry, authorized the payment of a bounty on the production of lead. The Act of 1903 provided for the payment, under certain restrictions, of 75 cents per hundred pounds on lead contained in ore mined and smelted in Canada, provided that when the standard price of pig lead in London, England, exceeded £12 10s. per ton of 2,240 pounds, such bounty should be reduced proportionately by the amount of such excess. Thus, when the price of lead in London rose to £16, or over, per long ton, the bounty ceased. As the price of lead exceeded £16 sterling on the London market for a considerable period during 1906 and 1907 the bounty paid during those years was comparatively small.

The Act of 1903 provided that payment of bounty should cease on June 30, 1908, and as only a portion of the funds provided had been used, a new Act was passed in the latter year providing for further bounty payments at the rate of 75 cents per one hundred pounds, or approximately £3 10s. per ton of 2,240 pounds, subject to the restriction that when the price of lead in London exceeds £14 10s. the bounty shall be reduced by such excess.

The Act of 1908 expired in 1913, and a new Act was passed extending the bounty for a further period of five years, with the same provisions. The text of this Act and of the regulations under which the Act is administered may be consulted in the "Annual Report on Mineral Production for 1914," and previous years.

Statement of Bounties Paid on Lead during the Fiscal Years 1899 to 1916.

Year ending.	Bounty paid.	Year ending.	Bounty paid.	Year ending.	Bounty paid.
June 30, 1899.....	\$ 76,665	June 30, 1906.....	\$ 90,196	March 31, 1913....	\$ 68,065
" 30, 1900.....	43,335	March 31, 1907....	1,995	" 31, 1914....	8,179
" 30, 1901.....	30,000	" 31, 1908....	51,001	" 31, 1915....	3,217
" 30, 1902.....	4,380	" 31, 1909....	307,433	" 31, 1916....	59
" 30, 1903.....	195,627	" 31, 1910....	340,542	Total.....	1,979,164
" 30, 1904.....	330,645	" 31, 1911....	248,534		
" 30, 1905.....		" 31, 1912....	179,288		

MERCURY.

There has been no production of mercury since 1897. The small production reported in 1895 and 1897 was derived from the deposits at the western end of Kamloops lake, B.C. These deposits consist of quartz veins containing pockets of cinnabar in a zone of decomposed Tertiary volcanic rocks.

Elsewhere in Canada mercury has been reported as also occurring in ores of the Cobalt district, and in the neighbourhood of Field, B.C., and Sechart on the west coast of Vancouver island.

The imports of mercury during the calendar year 1915, were 184,432 pounds valued at \$159,184, as against 204,229 pounds, valued at \$97,449 in 1914.

The following tables give the production of mercury in Canada and the imports since 1882, also the average monthly price for the last two years in New York, San Francisco, and London:—

Production of Mercury.

Calendar Year.	Flasks.*	Price per flask.	Value.
1895.....	71	\$33.00	\$2,343
1896.....	58	33.44	1,940
1897.....	9	36.00	324

* Seventy-six and one half (76½) pounds each.

Imports of Mercury.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1882.....	2,443	\$ 965	1894.....	36,914	\$ 14,483	1906.....	150,364	\$ 69,505
1883.....	7,410	2,991	1895.....	63,732	25,703	Calendar Year.		
1884.....	5,848	2,441	1896.....	77,869	32,353	1907.....	189,841	82,873
1885.....	14,490	4,781	1897.....	76,058	33,534	1908.....	87,620	44,030
1886.....	13,316	7,142	1898.....	59,759	36,425	1909.....	285,958	147,625
1887.....	18,409	10,618	1899.....	103,017	51,695	1910.....	107,888	63,450
1888.....	27,951	14,943	1900.....	85,342	51,987	1911.....	118,336	67,416
1889.....	22,931	11,844	1901.....	140,610	94,564	1912.....	137,474	72,171
1890.....	15,912	7,677	1902.....	97,283	56,615	1913.....	219,442	109,493
1891.....	29,775	20,223	1903.....	164,968	91,625	1914.....	204,229	97,449
1892.....	30,936	15,038	1904.....	151,107	80,658	1915*.....	184,432	159,184
1893.....	50,711	22,998	1905.....	103,330	48,412			

*Duty free.

Average Monthly price of Mercury.

(Per Flask of 75 pounds).

Month.	1914.			1915.		
	New York.	San Francisco.	London.	New York.	San Francisco.	London.
January.....	\$38.75	\$38.63	£ 7.50	\$51.60	\$50.80	£ 11.35
February.....	39.00	38.50	7.50	59.38	58.00	12.28
March.....	38.60	38.30	7.30	73.13	62.16	12.50
April.....	38.00	38.00	7.00	71.50	64.31	12.44
May.....	37.90	37.60	7.00	77.20	67.50	11.80
June.....	38.00	37.13	7.00	95.63	88.13	15.13
July.....	36.75	36.50	6.75	95.50	92.50	17.94
August.....	83.00	90.00	.....	92.50	89.25	18.15
September.....	74.38	74.00	.....	89.50	88.00	16.50
October.....	53.75	53.50	.....	94.70	90.80	15.90
November.....	50.30	51.00	.....	108.13	102.00	16.38
December.....	51.25	51.00	.....	135.00	121.25	16.63
Year.....	\$48.31	\$48.68	.....	\$ 87.01	\$ 81.23	£14.75

MOLYBDENUM.

The commercial production of molybdenum ore in Canada has been practically negligible, nevertheless the mineral has been found in numerous localities and in many of these in sufficient quantity to make its possible recovery a question of considerable interest, an interest which doubtless has been greatly stimulated by the high price which the ore, concentrated to 85 or 90 per cent molybdenite (MoS_2), has commanded.

During 1913, 1914, and 1915 some work was done on a number of properties in Ontario, Quebec, and British Columbia.

The total shipments in the form of molybdenite, were in 1915, 29,210 pounds, valued at \$28,450, as against 3,814 pounds, valued at \$2,063, in 1914. This production came from Ontario and British Columbia.

In 1902 about 6,500 pounds of molybdenum ore, valued at \$400 were reported as having been taken from a deposit in the township of Laxton, county of Victoria, Ontario, by John Webber, of Toronto.

In 1903, Mr. A. M. Chisholm, of Kingston, reported the shipment to the United States, and elsewhere, of 85 tons of molybdenum ore valued at \$1,275, culled from about 500 or 600 tons of rock taken from the east half of lot 5, concession XIV, Sheffield township, Addington county, Ontario.

Quebec.—During 1915, some development work was done by the Aldfield Mineral Syndicate on their property in Aldfield township, Pontiac county, and by the Height of Land Mining Co., in Preissac township, near Kewagama lake, Timiskaming.

Ontario.—The Algonican Development Co. Ltd., did some development at Mount St. Patrick, Brougham township, Renfrew county. W. J. Spain was operating in the same district and shipped some ore during the year—he has a mill under construction.

A. M. Chisholm has been operating his property in Sheffield township, county of Addington, and shipped several tons to the Mines Branch Ore Dressing and Metallurgical laboratories at Ottawa.

The Orillia Molybdenum Co. Ltd., have operated their property in Renfrew county and have treated with their ore, some custom ores from the district. This Company has established at Orillia, Ont., a plant for the treatment of molybdenite ores and has marketed both concentrates and refined products.

British Columbia.—The molybdenite claims on Lost creek, 14 miles from Salmo, were owned by Messrs. Ross, Bennett and Benson, and have been operated under lease by M. A. Merrill, of Vancouver. The shipments in 1915 amounted to about 5,910 pounds of molybdenite contained in ore.

The Provincial Mineralogist reports that: "The actual output of molybdenite during the year was confined to a shipment from the Molly

group, on Lost creek, in the Nelson Mining Division, which was sent to the Henry E. Woods Ore Concentrating Company, Denver, Colorado; this shipment amounted to 24 tons and contained by assay 12.26 per cent of molybdenite. Some development work was done on the property and it is now under lease and bond to a Vancouver syndicate, which intends to erect in the spring a small concentrator. The market requirements are such that a molybdenite ore must be concentrated up to 85 or 90 per cent molybdenite (MoS_2) before it is marketable. The Lost Creek property has several thousand tons of from 2 to 4 per cent ore, so that, with a suitable mill, a small production could be maintained."

"Another property, on Alice arm, in the Skeena Mining Division controlled by J. D. Ross, of Seattle, is reported to have a large showing of molybdenite, and it is said that a mill is being erected on it which will soon be producing a ton a day of high-grade concentrates. Other prospects in the Nelson, Kamloops and Lillooet Mining Divisions showing some molybdenite have been investigated, but as yet none of them have assumed any great importance."

Prices.—There has been a small annual production of molybdenite in Australia since 1900 and previous to 1914 the price varied generally between \$400 and \$600 per ton for ore containing a minimum of 85 per cent MoS_2 .

In January of 1914 according to the "Engineering and Mining Journal, of New York, "Such ore would be worth from \$8 to \$10 per unit, providing the ore be free from copper, arsenic, bismuth and tungsten. Any one of these elements will reduce the price of the ore. For instance: 90 per cent ore free from these elements is at present worth \$12.50 per unit, practically twice the price of tungsten ore. Lower grade ores are worth much less."

During December 1914 as high as 135s. per unit was quoted (— £607 per gross ton or \$1.32 per pound for 90 per cent ore).

"In the early part of 1915 the inquiry for Molybdenum products dropped to practically nothing, the sudden demand in the last quarter of 1914 proving to be but a temporary interest.

"The demand, however, caused molybdenum to be prospected for as never before, with the natural result that molybdenum ores are offered very freely, with practically no demand at the present time."*

Molybdenite ore containing 85 to 90 per cent molybdenum was worth towards the close of 1915 from \$2,500 to \$3,000 delivered in New York.

Early in 1915 the export of molybdenite to foreign destinations was prohibited except under license. Since September of 1915 the Imperial Government has requisitioned all supplies of molybdenite arriving in the United Kingdom at the price of five pounds, five shillings (105s.) per unit, cost, insurance and freight or ex. warehouse, on the basis of 90 per cent MoS_2 , less one per cent brokerage charges. Subsequently the basis was

*From the *Engineering and Mining Journal*, January 8, 1916.

reduced to a minimum of 85 per cent MoS_2 . The firms of H. H. Watson & Co., Liverpool, was appointed by His Majesty's Government to act as brokers for the purchase of these ores. At a later date the Imperial Munitions Board at Ottawa was authorized to purchase molybdenite ores in Canada.

A special report¹ describing the principal Canadian molybdenite occurrences, discovered prior to 1910, has been published by the Mines Branch. This Branch, through its Ore Dressing and Metallurgical division, has also undertaken concentration tests of these ores. A preliminary report² on these tests has already been published in the Summary Report of the Mines Branch for 1913.

The following firms are believed to be purchasers of molybdenite: The Electro Metallurgical Company of America, New York; Primos Chemical Company, Primos, Penn.; DeGobia and Atkins, San Francisco, Cal.; Geo. G. Blackwood, Sons & Co.; The Albany, Liverpool, England; W. C. Willis & Co., 90 Mitchell St., Glasgow; J. Cameron, Swan & Co., 4 St. Nicholas Bldgs., Newcastle-on-Tyne, England; Sir A. G. Armstrong, Whitworth & Co., 8 Great George St., Westminster, London, England.

The annual production of molybdenite in Australia (Queensland and New South Wales) is shown in the accompanying table:—

Annual Production of Molybdenite in Australia.

Year.	Queensland (a).		New South Wales (b).	
	Long tons.	£	Long tons.	£
1900.....	11.00	561		
1901.....	*26.00	1,609		
1902.....	*41.00	5,502	15.00	1,841
1903.....	*24.00	2,100	29.00	4,458
1904.....	21.65	2,746	25.25	2,726
1905.....	*84.75	10,454	19.40	2,507
1906.....	*129.15	17,034	32.65	4,798
1907.....	*17.15	9,660	21.65	3,564
1908.....	*168.85	14,686		
1909.....	*156.75	13,820		
1910.....	*139.90	16,914		
1911.....	*228.50	24,842		
1912.....	*197.50	19,261	56.55	3,706
1913.....	66.00		78.80	6,802
1914 (c).....	78.00	38,190	61.00	11,451
1915.....	(d) 97.00			(e) 16,937

(a) From the Annual Report of the Dept. of Mines, New South Wales.

(b) From the Annual Report of the Under Secretary for Mines, Queensland.

(c) From the Annual Report of the Dept. of Mines of Western Australia.

(d) From the "London Mining Journal," June 10, 1916.

(e) From the "London Mining Journal," May 13, 1916.

* Includes bismuth and wolfram.

¹ No. 93, "Report on the Molybdenum Ores of Canada," by T. L. Walker, Ph. D., Mines Branch, Department of Mines, Ottawa, 1911.

² No. 285, "Summary Report, Mines Branch, Department of Mines," 1913, pp. 66-71.

NICKEL.

The industry based on the mining and metallurgical treatment of the nickel-copper ores of the Sudbury district, Ontario, ranks among the most important of Canada. Not only is there a considerable production of copper but the nickel, which is the important product, supplies a very large proportion of the world's consumption of the metal.

The past few years' development has very largely increased the known ore reserves of the district. These nickel-copper deposits have been the subject of special reports by the Mines Branch and Geological Survey at Ottawa, and by the Ontario Bureau of Mines, Toronto.*

The production of nickel in 1915 amounted to 68,308,657 pounds, valued at \$20,492,597, as compared with 45,517,937 pounds valued at \$13,655,381 in 1914, an increase of 50·7 per cent, and was by far the highest on record.

There were mined in 1915, 1,364,048 tons of ore, and smelted 1,272,283 tons, from which were produced 67,703 tons of Bessemer matte, carrying approximately 34,039 tons of nickel and 19,608 tons of copper. The net value of the matte, as reported by the operators was \$10,352,344 which is based on an average value of 7·2 cents per pound for copper, and 11·1 cents per pound for the nickel.

The average metal recovery in matte from the ores treated was 1·541 per cent copper and 2·675 per cent nickel.

The nickel-copper ore is reduced in smelters and converters to a Bessemer matte containing from 77 to 82 per cent of the combined metals, having averaged for the past year 50·3 per cent nickel and 29·0 per cent copper, as against 49·0 per cent nickel and 31·1 per cent copper in 1914, and 52·7 per cent nickel and 27·4 per cent copper in 1913.

For the production of monel metal, a special matte is produced with contents of about 22 per cent copper and 58 per cent nickel, which is included in the total given above. Monel metal is produced directly from this matte without the intermediate refining of either the nickel or the copper.

* Report on Nickel and Copper Deposits of Sudbury, Ont., by A. E. Barlow, Geological Survey, Canada. No. 873, 1901.

The Sudbury Nickel Region, by A. P. Coleman, Ph.D., Bureau of Mines, Vol. XIV, Part III, 1904.

The Nickel Industry, with special reference to the Sudbury Region, Ont. Report by A. P. Coleman Ph.D., Mines Branch, Ottawa, No. 170, 1913.

The following are the aggregate results of the production and treatment of nickel-copper ores in Ontario during the past four years, with also the annual production of nickel since 1889:—

Production of Nickel.

	1912.	1913.	1914.	1915.
Ore mined.....Short tons.	737,726	784,697	1,000,364	1,364,048
Ore smelted....."	725,065	823,403	947,053	1,272,283
Bessemer matte produced....."	41,925	47,150	46,396	67,703
Copper content of matte....."	11,116	12,938	14,448	19,608
Nickel " " "....."	22,421	24,838	22,759	34,039
Spot value of matte.....	\$6,303,102	\$7,076,945	\$7,189,031	\$10,352,344
Wages paid miners and smelters.....	\$2,626,609	\$3,291,956	\$3,096,911	\$3,555,912
Men employed.....	3,110	3,486	3,379	4,033

Annual Production of Nickel.

Calendar Year.	Pounds of nickel in matte shipped.	Cents per pound.	Value.	Calendar Year.	Pounds of nickel in matte shipped.	Cents per pound.	Value.
1889 (a).....	830,477	60	\$ 498,286	1902.....	10,693,410	47	\$5,025,903
1890.....	1,435,742	65	933,232	1903.....	12,505,510	40	5,002,204
1891.....	4,035,347	60	2,421,208	1904.....	10,547,883	40	4,219,153
1892.....	2,413,717	58	1,399,956	1905.....	18,876,315	40	7,550,526
1893.....	3,982,982	52	2,071,151	1906.....	21,490,955	42	8,948,834
1894.....	4,907,430	38½	1,870,958	1907.....	21,189,793	45	9,535,407
1895.....	3,888,525	35	1,360,984	1908.....	19,143,111	43	8,231,538
1896.....	3,397,113	35	1,188,990	1909.....	26,282,991	36	9,461,877
1897.....	3,997,647	35	1,399,176	1910.....	37,271,033	30	11,181,310
1898.....	5,517,690	33	1,820,838	1911.....	34,098,744	30	10,229,623
1899.....	5,744,000	36	2,067,840	1912.....	44,841,542	30	13,452,463
1900.....	7,080,227	47	3,327,707	1913.....	49,676,772	30	14,903,032
1901.....	9,189,047	50	4,594,523	1914.....	45,517,937	30	13,655,381
				1915.....	68,308,657	30	20,492,597

(a) Calculated from shipments made by rail.

Refined metallic nickel is now being recovered in Canadian refineries but only in small quantities and as a by-product in the smelting and refining of the silver-cobalt-nickel ores, nickel oxide having been recovered in these smelters for several years. The recovery of nickel-sulphate was also reported for the first time in 1915. A considerable amount of nickel is probably contained in ores exported for smelting for which no payment is received by the mines shipping and the amount finally recovered is impossible to ascertain.

The production of metallic nickel during 1915 was reported as 55,325 pounds, valued at \$22,130, and nickel-oxide and nickel-sulphate 282,025 pounds valued at \$31,262.

The total nickel content of recoveries from silver-cobalt-nickel ores was 231,634 pounds.¹

¹ See chapter on "Cobalt."

The production of nickel-oxide during 1914 was 392,512 pounds.

The companies engaged in mining and smelting nickel ores are: The Canadian Copper Company, subsidiary to the International Nickel Company, with smelter at Copper Cliff, Ontario, and refinery at Bayonne, New Jersey; the Mond Nickel Company, Coniston, of London, England, with smelter at Coniston, Ontario, and refinery at Clydach, Swansea, Wales. The Alexo mine, on the Porcupine Branch of the Timiskaming and Northern Ontario Railway, was again a producer, shipping nickel-copper ore to the Mond smelter at Coniston. The Sudbury Leasing and Development Co. of Sudbury, was also shipping ore to the Coniston smelter.

Prices.—The price of refined nickel in New York remained fairly constant during the first seven months of the year 1915, quotations published by the Engineering and Mining Journal being 40 to 45 cents per pound for ordinary forms with 5 cents per pound more asked for electrolytic nickel. During the last five months of the year prices ranged between 45 and 50 cents for ordinary forms.

The price during 1914 was quoted at 45 cents per pound for nickel shot, blocks or plaquettes, and electrolytic nickel 5 cents higher per pound.

The price of nickel in Europe in 1915, as given by the "London Mining Journal," was quoted between £186 and £206 (40·4 to 44·7 cents per pound) from January 1st, until the end of May, when it rose to £210, and gradually increased until it reached in the last week in July a quotation of £225 per long ton (48·8 cents per pound) and remained at that price until the close of the year.

Exports and Imports.—The exports in 1915 amounted to 66,410,442 pounds of which 13,747,991 pounds, or 20·7 per cent went to Great Britain, and 52,662,451 pounds, or 79·3 per cent to the United States.

In 1914, 22·1 per cent of the total exports went to Great Britain and 77·4 per cent to the United States.

The exports of nickel to Great Britain in 1914, were almost double those of 1913 and there was a further increase in 1915. The exports to the United States which had fallen off nearly 20 per cent in 1914 showed an increase in 1915 of over 46 per cent.

The exports by countries during the past four years and the annual exports since 1890 are shown in the accompanying tables:—

Destination.	1912.	1913.	1914.	1915.
To Great Britain..... Pounds.	5,072,867	5,164,512	10,291,979	13,747,991
To United States..... "	39,148,993	44,224,119	36,015,642	52,662,451
To other countries..... "	.....	70,386	220,706	.....
Total.....	44,221,860	49,459,017	46,528,327	66,410,442

Exports of Nickel Contained in Ore, Matte, or Other Product.

Calendar Year.	Value.	Calendar Year.	Pounds.	Value.	Cents per pound.
1890.....	\$ 89,568	1903.....	12,699,227	\$1,116,099	8.78
1891.....	667,280	1904.....	11,233,869	1,091,349	9.71
1892.....	293,149	1905.....	17,318,059	1,569,693	9.06
1893.....	629,692	1906.....	20,653,845	2,042,965	9.89
1894.....	559,356	1907.....	19,376,335	2,280,374	11.76
1895.....	521,783	1908.....	19,419,893	1,866,624	9.61
1896.....	658,213	1909.....	25,616,398	2,676,483	10.45
1897.....	723,130	1910.....	36,014,782	4,030,040	11.19
1898.....	1,019,363	1911.....	32,619,971	3,676,396	11.27
1899.....	939,915	1912.....	44,221,860	4,661,758	10.54
1900.....	1,031,030	1913.....	49,459,017	5,195,560	10.50
1901.....	751,080	1914.....	46,528,327	5,149,427	11.07
1902.....	1,007,211	1915.....	66,410,442	7,394,446	11.13

The imports of nickel are classed with those of nickel-silver and German silver and manufactures of these metals. There is also a considerable import of nickel-plated ware.

The imports in 1915 consisted of nickel in ingots, bars, sheets, etc., to the amount of 710,344 pounds, valued at \$197,168, and manufactures of nickel, valued at \$77,538.

The imports of nickel, nickel-silver, German silver, etc., during 1914 and 1915 have been as follows:—

Imports of Nickel, Nickel-Silver, and German Silver, 1914 and 1915.

	1914.		1915.	
	Pounds.	Value.	Pounds.	Value.
Nickel, nickel-silver, and German silver in ingots or blocks.....	70,564	\$ 25,362	635,963	\$169,807
Nickel, nickel-silver, and German silver in bars and rods and also in strips, sheets or plates.....	549,288	130,065	74,381	27,361
Manufactures of German, Nevada, and nickel-silver, not plated.....		83,185		77,538

In view of the large export of nickel from Canada to the United States and its refinement in that country, a record of the imports into, and exports of nickel from the United States, may be of special interest and is shown below as compiled from the "Foreign Commerce of the United States."

The values of the United States exports ranged from 34 to 43 cents per pound, with an average of 38 cents in 1915, as against 32 to 39 cents per pound and an average of 34 cents per pound in 1914.

The imports and exports from the United States for the calendar years 1914 and 1915, and for the fiscal years 1910-1915 are given in the following tables:—

United States: Imports and Exports of Nickel.*

	1914.			1915.		
	Quantity.	Value.	Cents per pound.	Quantity.	Value.	Cents per pound.
<i>Imports into United States—</i>						
Ore and matte.....Gross tons	29,564	\$4,956,448	13.77	45,798	\$7,615,999	13.52
Nickel content.....Pounds.	36,006,700			56,352,582		
<i>Exports from United States—</i>						
To France.....Pounds.	3,457,157	1,203,370	34.80	3,018,354	1,124,382	37.25
" Netherlands..... "	855,168	332,057	38.83	129,557	55,954	43.29
" United Kingdom. " "	10,836,369	3,861,913	35.64	14,801,565	5,317,532	35.92
" Other countries... "	12,446,458	4,058,188	32.60	8,469,074	3,540,646	41.80
Totals.....	27,595,152	9,455,528	34.26	26,418,550	10,038,514	38.00

Imports of Nickel Ore and Matte into the United States during the following fiscal years ending June:—*

From:	1910.	1911.	1912.	1913.	1914.	1915.
Belgium.....						
{Tons.		91	1,078	1,371	1,243	242
{Pounds.		146,656	1,587,598	2,498,262	2,037,008	317,971
Norway.....						
{Tons.					3	366
{Pounds.					5,040	530,704
Canada.....						
{Tons.	22,470	24,072	26,373	35,597	35,174	29,592
{Pounds.	27,619,601	29,805,590	32,414,454	(a) 45,010,108	(b) 41,507,255	(c) 36,607,235
Oceania—French....						
{Tons.	3,000					
{Pounds.	376,724					
" Australia....						
{Tons.						601
{Pounds.						539,109
Totals.....						
{Tons.	25,470	24,163	27,451	36,968	36,420	30,801
{Pounds.	27,996,325	29,952,246	34,002,052	47,508,370	43,549,303	37,995,019

(a) Value, \$5,825,642. (b) Value, \$5,621,480. (c) Value, \$4,788,145.

* From the "Foreign Commerce of the United States, Dec., 1915.

**Exports of Nickel, Nickel Oxide and Matte from the United States
during the following fiscal years, ending June:—***

To	1910.	1911.	1912.	1913.	1914.	1915.
Austria-Hungary.....Pounds.				134,400	672,043	67,200
Belgium....."	436,953		551,740	1,719,285	1,230,274	210,612
Denmark....."						43,830
France....."	1,212,539	3,765,510	5,579,333	4,197,110	4,419,663	3,210,980
Germany....."	548,589	1,902,393	2,527,273	2,346,325	11,084,366	1,036,242
Italy....."	546,983	604,938	1,321,733	1,075,303	1,276,905	2,365,177
Netherlands....."	7,166,322	8,205,836	7,584,653	9,164,012	2,376,216	22,033
Norway....."						31,158
Russia in Europe....."	3,200			7,250	186,626	4,082,280
Spain....."						700
Sweden....."						367,696
U. Kingdom:—						
England....."	2,497,430	1,342,714	3,019,833	2,334,845	2,171,511	8,535,418
Scotland....."	1,189,694	3,114,166	5,970,045	6,878,264	5,433,081	7,817,384
N. America:—						
Canada....."	47,091	8,926	3,373	16,379	42,529	52,949
Mexico....."		40				1,779
W. Indies (Brit.)....."						300
S. America:—						
Argentina....."	2,339					
Brazil....."				1,796		
Columbia....."				32		
Asia:—						
Japan....."		1,957	4,005	5,447	2,028	308,444
Russia in Asia....."						1,423,030
Oceania:—						
Brit. Australia and Tasmania....."	1,267	1,330		829		22,400
	13,652,407	18,947,810	26,561,990	27,881,277	28,895,242	29,599,612

*From Reports on the commerce and navigation of the United States, Department of Commerce, Washington, D.C.

Bounty on Refined Nickel and Nickel-oxide.—Under the terms of "The Metal Refining Act, 1907," of the Province of Ontario (7 Edward VII, Chap. XIV) a bounty is authorized to be paid on nickel, cobalt, copper, and arsenic under certain conditions and restrictions during a period of five years following the passing of the Act (April, 1907). In March, 1912, the Act was amended to cover a further period of five years.

The sections affecting nickel are as follows:—

"The Treasurer of the Province may under the authority of such regulations as may from time to time be made in that behalf by the Lieutenant Governor in Council pay in each year to the refiners of the metals or metal compounds hereinafter specified when refined in the Province from ores raised and mined in the Province, a bounty on each pound of such metal or compound so refined, as follows":—

"Class 1. On refined metallic nickel or on refined oxide of nickel, 6 cents per pound on the free metallic nickel or on the nickel contained in the nickel-oxide, but nickel on which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form, and the amount to be paid as bounty on the nickel products therein mentioned is not to exceed in all \$60,000 in any one year."

PLATINUM AND PALLADIUM.

In past years the chief source of the platinum production of Canada was the placer gravels of British Columbia, principally in the Similkameen district.

During 1915 there was much activity in the Similkameen and Tulameen districts, and the reported recovery of platinum was 23 crude ounces, valued at \$1,063.

The United States Department of Commerce reports the importation into the United States from Canada during 1915 of 100 ounces of platinum, and the Canadian Department of Customs reports the exports from Canada of 236 ounces of platinum, valued at \$11,052. There is a possibility that the Canadian export recorded may include old and scrap platinum. However it is equally possible that the production of platinum may be considerably greater than that actually reported.

One or two companies operating in the Quesnel River district in 1914, reported small quantities of platinum with placer gold but the information was not sufficiently definite for record.

During 1913 operators in the Cariboo district of British Columbia reported a recovery of 18 crude ounces of platinum valued at \$489.

Statistics of the annual production of platinum and palladium are given in the following tables:—

Annual Production of Platinum.

Year.	Value.	Year.	Value.	Year.	Crude ounces.	Value.
1887.....	\$ 5,600	1895.....	\$ 3,800	1903.....		\$ 33,345
1888.....	6,000	1896.....	750	1904.....		10,872
1889.....	3,500	1897.....	1,600	1905.....		500
1890.....	4,500	1898.....	1,500	1906.....		*
1891.....	10,000	1899.....	825	1907-1912.....		**
1892.....	3,500	1900.....	Nil.	1913.....	18	489
1893.....	1,800	1901.....	457	1914.....		
1894.....	950	1902.....	46,502	1915.....	23	1,063

*See under Palladium.

**See explanation in text.

Annual Production of Palladium.

	Ounces.	Value.
1902 Palladium.....	4,411	\$86,014
1903 ".....	3,177	61,952
1904 ".....	952	18,564
1905 Metals of the platinum group.....	1,562	28,116
1906 ".....	314	5,652
1907-1915.....	(a)	

(a) See explanation in text.

The nickel-copper ores of the Sudbury district also carry small quantities of the metals of the platinum group, and since 1902 considerable quantities of these metals have been recovered from the residues resulting from the treatment of the mattes from Sudbury.

The recovery of gold, silver, platinum, and palladium at the works of the International Nickel Company in New Jersey for the six years ending December 31, 1912, was as follows:—

Year.	Gold.	Silver.	Platinum.	Palladium.
1907 Ounces.	993·572	63,400·70	226·800	607·300
1908	5,238·181	139,329·29	172·316	382·287
1909	2,113·669	63,138·66	546·627	1,270·598
1910	2,649·799	60,256·83	258·325	522·804
1911	2,203·052	70,954·38	665·552	753·363
1912	2,476,558	62,169·66	496·850	680·130
	15,674·831	459,249·52	2,366·470	4,216·482

In view, however, of the fact that other material has been treated in the Company's works in addition to the nickel-copper mattes from Copper Cliff, Ontario, it is impossible to state what proportion of the above recoveries was from Canadian sources, although, it is, of course, safe to assume that part of these metals has been derived from the Sudbury District mattes. The Company reported there had been no production in 1913, 1914, or 1915 from Canadian ores.

The average monthly price of refined platinum in New York fell from \$41.10 per ounce in January to \$38.00 in June and July, but increased rapidly during the last five months of the year to an average of \$85.50 in December.

The average monthly prices during 1914 and 1915 and the average yearly prices since 1910 are given in the following tables:—

Average Monthly Prices of Platinum, 1914 and 1915.*

(In dollars per ounce Troy).

Month.	1914.			1915.		
	New-York refined Platinum.	St. Petersburg 83%.	Ekaterin-burg crude metal Platinum.	New-York refined Platinum	St. Petersburg 83%.	Ekaterin-burg crude metal Platinum.
January	43.38	36.43	36.28	41.10	.....	.....
February	43.50	36.36	36.28	40.00	30.38	30.08
March	43.50	36.39	36.28	39.50	30.38	30.08
April	43.50	36.46	36.28	38.63	30.38	30.08
May	43.50	36.41	36.28	38.50	30.57	30.08
June	43.50	36.09	36.00	38.00	32.39	31.02
July	43.50	35.72	35.72	38.00	32.39	31.02
August	50.20	.....	.....	39.25	32.30	30.73
September	50.00	.....	35.72	50.00	.....	.....
October	49.50	.....	33.84	54.50	37.98	38.70
November	45.45	.....	.....	62.63	47.46	46.64
December	42.19	.....	.....	85.50	56.40	56.25
Year	45.14	.....	.....	47.13	.....	.....

Average Yearly Prices of Platinum.*

(In dollars per ounce troy).

	1910.	1911.	1912.	1913.	1914.	1915.
New York refined platinum.....	32.70	43.12	45.55	44.88	45.14	47.13
St. Petersburg, Russia, 83%.....	26.96	35.21	37.08	36.54	.....	.....
Ekaterinburg crude metal platinum..	26.37	35.09	37.05	36.25	.....	.....

*From quotation in Engineering and Mining Journal, p. 47, January 8, 1916.

Statistics of the annual imports of platinum since 1883 are given in the following table:—

Imports of Platinum.*

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1883.....	\$ 113	1889.....	\$ 3,167	1895.....	\$ 3,937	1901.....	\$20,263
1884.....	576	1890.....	5,215	1896.....	6,185	1902.....	19,357
1885.....	792	1891.....	4,055	1897.....	9,031	1903.....	21,251
1886.....	1,154	1892.....	1,952	1898.....	9,781	1904.....	28,112
1887.....	1,422	1893.....	14,082	1899.....	9,671	1905.....	61,719
1888.....	13,475	1894.....	7,151	1900.....	57,910	1906.....	54,494

Calendar Year.	Crucibles.	Wire and bars, strips, sheets, or plates.	Retorts, pans, con- densers, etc.	Total Imports.
	Value.	Value.	Value.	Value.
1907.....	\$2,974	\$ 89,719	\$ 3,415	\$ 96,108
1908.....	1,709	37,223	5,321	44,253
1909.....	3,617	61,441	9,432	74,590
1910.....	2,133	100,185	10,744	113,062
1911.....	4,549	170,944	.....	175,493
1912.....	7,874	224,216	73	232,163
1913.....	4,557	141,117	.....	145,674
1914.....	9,795	69,736	142	79,673
1915.....	5,147	65,040	13,900	84,087

*Platinum wire and platinum in bars, strips, sheets or plates; platinum retorts, pans, condensers, tubing and pipe, imported by manufacturers of sulphuric acid for use in their works; crucibles. Duty free.

SILVER.

In 1915 the total production of silver, including that produced as bullion and the metal estimated as recovered from ores sent to smelters or otherwise treated, was 26,625,960 fine ounces, valued at \$13,228,842, as compared with 28,449,821 fine ounces, valued at \$15,593,630 in 1914, showing a falling off of 1,823,861 fine ounces or 6·4 per cent in quantity, and \$2,364,788, or 15·1 per cent in value. The production of 1914 had shown a falling off of 10·6 per cent in quantity and 18·2 per cent in value, from that of 1913.

Of the total production in 1915, 21,573,844 ounces, or 81 per cent, was in the form of refined silver, or silver contained in silver and gold bullion; 688,811 ounces, or 2·6 per cent was contained in blister copper and copper matte produced, and 4,363,305 ounces, or 16·4 per cent was estimated as recoverable from ores exported.

From 1887 to 1893 the production ranged in value between \$300,000 and \$400,000, and was derived chiefly from Ontario and Quebec. The next three years saw a rapid increase in production, due to the development of the silver-lead deposits of British Columbia, and in 1896 a production of over \$2,000,000 is recorded. From that year until 1905 the production varied between \$2,000,000 and \$3,500,000 rising rapidly during the next six years to \$17,580,455 in 1910, as a result of the discovery of the rich ores of the Cobalt district. Since then, there has been a falling off in quantity, but owing to the higher price of the metal, the total value was higher in 1912 and 1913.

Statistics of the annual production of silver since 1887 are given in the following table:—

Annual Production of Silver 1887-1915

Year.	Ounces.	Value.	Cents per ounce.	Year.	Ounces.	Value.	Cents per ounce.
1887.....	355,083	\$ 347,271	98·00	1901.....	5,539,192	\$3,265,354	58·95
1888.....	437,232	410,998	94·00	1902.....	4,291,317	2,238,351	52·16
1889.....	383,318	358,785	93·60	1903.....	3,198,581	1,709,642	53·45
1890.....	400,687	419,118	104·60	1904.....	3,577,526	2,047,095	57·22
1891.....	414,523	409,549	98·00	1905.....	6,000,023	3,621,133	60·35
1892.....	310,651	272,130	86·00	1906.....	8,473,379	5,659,455	66·79
1893.....	.....	330,128	77·00	1907.....	12,779,799	8,348,659	65·33
1894.....	847,697	534,049	63·00	1908.....	22,106,233	11,686,239	52·86
1895.....	1,578,275	1,030,299	65·28	1909.....	27,529,473	14,178,504	51·50
1896.....	3,205,343	2,149,503	67·06	1910.....	32,869,264	17,580,455	53·49
1897.....	5,558,456	3,323,395	59·79	1911.....	32,559,044	17,355,272	53·30
1898.....	4,452,333	2,593,929	58·26	1912.....	31,955,560	19,440,165	60·83
1899.....	3,411,644	2,032,658	59·58	1913.....	31,845,803	19,040,924	59·79
1900.....	4,468,225	2,740,362	61·33	1914.....	28,449,821	15,593,630	54·81
				1915.....	26,625,960	13,228,842	49·68

Ontario produced in 1905, 40·9 per cent of the output of Canada, in 1911 its percentage was 93·8; in 1914 it had fallen to 88·4 per cent, and in 1915 it decreased again to 85·4 per cent.

The production of British Columbia, which has varied between two and five million ounces for the last twenty years, was in 1914, 11·1 per cent of the total production of Canada, and in 1915 it increased to 13·4 per cent.

Quebec, and the Yukon, have produced but a small proportion of the total, being in 1915, 0·3 per cent for Quebec, and 0·9 per cent for the Yukon.

Statistics of the silver production by provinces since 1887, are given in the following table:—

Production of Silver by Provinces, 1887-1915.

Year.	ONTARIO.		QUEBEC.		BRITISH COLUMBIA.		YUKON TERRITORY.	
	Ounces.	Value.	Ounces.	Value.	Ounces.	Value.	Ounces.	Value.
1887.....	190,495	\$ 186,304	146,898	\$143,666	17,690	\$ 17,301	.....	.....
1888.....	208,064	195,580	149,388	140,425	79,780	74,993	.....	.....
1889.....	181,609	169,986	148,517	139,012	53,192	49,787	.....	.....
1890.....	158,715	166,016	171,545	179,436	70,427	73,666	.....	.....
1891.....	225,633	222,926	185,584	183,357	3,306	3,266	.....	.....
1892.....	41,581	36,425	191,910	168,113	77,160	67,592	.....	.....
1893.....	.....	8,689	.....	126,439	.....	195,000	.....	.....
1894.....	.....	.....	101,318	63,830	746,379	470,219	.....	.....
1895.....	.....	.....	81,753	53,369	1,496,522	976,930	.....	.....
1896.....	.....	.....	70,000	46,942	3,135,343	2,102,561	.....	.....
1897.....	5,000	2,990	80,475	48,116	5,472,971	3,272,289	.....	.....
1898.....	85,000	49,521	74,932	43,655	4,292,401	2,500,753	.....	.....
1899.....	202,000	120,352	40,231	23,970	2,939,413	1,751,302	230,000	\$137,034
1900.....	161,650	99,140	58,400	35,817	3,958,175	2,427,548	290,000	177,857
1901.....	151,400	89,250	41,459	24,440	5,151,333	3,036,711	195,000	114,953
1902.....	145,000	75,632	42,500	22,168	3,917,917	2,043,586	185,900	96,985
1903.....	17,777	9,502	28,600	15,287	2,996,204	1,601,471	156,000	83,362
1904.....	206,875	118,376	15,000	8,583	3,222,481	1,843,935	133,170	76,201
1905.....	2,451,356	1,479,442	19,620	11,841	3,439,417	2,075,757	89,630	54,093
1906.....	5,401,766	3,607,894	17,686	11,813	2,990,262	1,997,226	63,665	42,522
1907.....	9,982,363	6,521,178	16,000	10,452	2,745,448	1,793,519	35,988	23,510
1908.....	19,398,545	10,254,847	13,299	7,030	2,631,389	1,391,058	63,000	33,304
1909.....	24,822,099	12,784,126	13,233	6,815	2,649,141	1,364,387	45,000	23,176
1910.....	30,366,366	16,241,755	7,593	4,061	2,407,887	1,287,883	87,418	46,756
1911.....	30,540,754	16,279,443	18,435	9,827	1,887,147	1,005,924	112,708	60,078
1912.....	29,214,025	17,772,352	9,465	5,758	2,651,002	1,612,737	81,068	49,318
1913.....	28,411,261	16,987,377	34,573	20,672	3,312,343	1,980,483	87,626	52,392
1914.....	25,139,214	13,779,055	57,737	31,646	3,159,897	1,731,971	92,973	50,959
1915.....	22,748,609	11,302,419	63,450	31,524	3,565,852	1,771,658	248,049	123,241

Prices.—The average monthly price of silver in New York, which was $48\frac{3}{4}$ cents for the first week of January, increased to 51 cents for the first week of March, then decreased to a minimum of $46\frac{1}{4}$ cents for the last week of July, increasing again to a maximum of $56\frac{1}{8}$ cents for the last week of November, and the year ended with silver at $54\frac{3}{4}$ cents per fine ounce.

The average for the year was 49·684 cents, as against 54·811 cents in 1914, and 59·791 cents in 1913.

In London the minimum weekly average was $22\frac{3}{8}$ pence per standard ounce 0.925 fine in the last week in July, and the maximum was 36 $15/16$ pence in the last week of November, with an average for the year of 23.675 pence, as against 25.315 pence in 1914.

The average monthly prices of silver in New York from 1910 to 1915 and in London during 1915, are shown in tabulated form following:—

Average Monthly Prices of Silver.

Months.	New York.—Cents per fine ounce.						London— Pence per Standard ounce (a).
	1910.	1911.	1912.	1913.	1914.	1915.	1915.
January.....	52.375	53.795	56.260	62.938	57.572	48.855	22.731
February.....	51.534	52.222	59.043	61.642	57.506	48.477	22.753
March.....	51.454	52.745	58.375	57.870	58.067	50.241	23.708
April.....	53.221	53.325	59.207	59.490	58.519	50.250	23.709
May.....	53.870	53.308	60.880	60.361	58.175	49.915	23.570
June.....	53.462	53.043	61.290	58.990	56.471	49.034	23.267
July.....	54.150	52.630	60.654	58.721	54.678	47.519	22.597
August.....	52.912	52.171	61.606	59.293	54.344	47.163	22.780
September.....	53.295	52.440	63.078	60.640	53.290	48.680	23.591
October.....	55.490	53.340	63.471	60.793	50.654	49.385	23.925
November.....	55.635	55.719	62.792	58.995	49.082	51.714	25.094
December.....	54.428	54.905	63.365	57.760	49.375	54.971	26.373
Average for the year....	53.486	53.304	60.835	59.791	54.811	49.684	23.675

(a) 925 parts fine. From "Engineering and Mining Journal," Feb. 5, 1916.

Important quantities of silver are being produced in Canada both as fine metal and as silver bullion ranging in fineness from 850 to 998.2. Fine silver is produced at Trail, B.C., by the Consolidated Mining and Smelting Company of Canada, Limited, being derived chiefly from the silver-lead ores of the Province, and finds a market in Canada, the United States, and China.

The annual production of fine silver at Trail, since 1904 has been as follows:—

Year.	Fine ounces.	Year.	Fine ounces.
1904.....	551,450	1911.....	1,325,601
1905.....	1,088,328	1912.....	1,896,999
1906.....	1,263,809	1913.....	2,433,002
1907.....	1,631,422	1914.....	2,043,868
1908.....	1,956,039	1915.....	2,362,429
1909.....	2,003,003		
1910.....	1,798,960	Total.....	30,354,910

In Ontario ores from the Cobalt district are treated by the Coniagas Reduction Co., Thorold, Ontario; Deloro Mining and Reduction Co., Deloro, Ontario; Metals Chemical Co., Welland, Ontario; Standard Smelting and Refining Co., Chippewa, Ontario.

Silver bullion varying from 850 to 998·2 is produced at these works, other products being white arsenic, metallic nickel and cobalt, sulphate of nickel and cobalt, nickel and cobalt-oxides and mixed oxides. The silver bullion as a rule finds a market in the United States and in England.

Bullion shipped by these Ontario smelters in 1907 contained 4,449,722 fine ounces of silver; in 1908, 11,168,689 ounces; in 1911, 17,753,167 ounces; in 1913, 11,356,707 ounces; in 1914, 9,042,993 ounces, and in 1915, 9,885,989 fine ounces.

The decrease is accounted for by the treatment of the greater part of the high grade ore in the camp itself.

The bullion shipped from the mines and mills in the Cobalt district in 1915, is reported as 9,204,893 fine ounces, as against 10,335,527 fine ounces in 1914.

United States smelters report the receipt of 7,310 tons of ore from the Cobalt district containing 3,580,843 fine ounces of silver, as against 7,206 tons containing 3,966,301 fine ounces in 1914.

Exports and Imports.—The exports of silver during 1915 were 27,672,481 fine ounces valued at \$13,812,038, as against exports of 28,020,089 fine ounces, valued at \$15,584,813 in 1914, and 37,371,569 fine ounces, valued at \$21,441,220 in 1913.

The imports of silver bullion into Canada in 1915 were valued at \$337,254, as against imports to the value of \$629,279 in 1914 and \$840,245 in 1913.

Statistics of silver contained in ore, matte or other form exported from Canada since 1886, and the imports of silver bullion into Canada since 1910 are given in the following tables:—

Exports of Silver in Ore, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1886.....	\$ 25,957	1896.....	\$2,271,959	1906.....	\$ 5,686,444
1887.....	206,284	1897.....	3,576,391	1907.....	9,941,849
1888.....	219,008	1898.....	2,902,277	1908.....	12,403,482
1889.....	212,163	1899.....	1,623,905	1909.....	15,719,909
1890.....	204,142	1900.....	2,341,872	1910.....	15,649,537
1891.....	225,312	1901.....	2,026,727	1911.....	15,807,366
1892.....	56,688	1902.....	1,820,058	1912.....	19,494,416
1893.....	213,695	1903.....	1,989,474	1913.....	21,441,220
1894.....	359,731	1904.....	1,904,394	1914.....	15,584,813
1895.....	994,354	1905.....	2,777,218	1915.....	13,812,038

Imports of Silver Bullion.

Calendar Year.	Value.	Calendar Year.	Value.
1910.....	\$ 975,045	1913.....	\$ 840,245
1911.....	847,645	1914.....	629,279
1912.....	1,100,344	1915.....	337,254

Quebec.

The small quantity of silver credited to Quebec province for a number of years represents a small silver content of the pyritic ores mined at Eustis and Weedon, in the Eastern Townships. The production in 1915 was 63,450 fine ounces, valued at \$31,524, as against 57,737 fine ounces, valued at \$31,646 in 1914.

Ontario.

The production of silver in Ontario increased from 17,777 fine ounces in 1903 to 2,451,356 fine ounces in 1905 and reached a maximum of 30,540,754 fine ounces in 1911. The maximum value \$17,772,352 was reached in 1912.

In 1915 the production was 22,748,609 fine ounces, valued at \$11,302,419, a decrease from 1914 of 9.5 per cent in quantity, and 17.9 per cent in value.

The production included in addition to the production of the Cobalt and adjacent silver camps, 74,787 ounces contained in gold bullion.

The silver ores of the Cobalt district, which in the early days of the camp were all exported for treatment, are being reduced to an increasing extent each year within the camp in cyanide and other mills, with recovery of silver bullion. During 1915, 9,204,893 ounces, or about 41 per cent of the output was thus recovered as bullion in the district, while 9,885,989 ounces, or 43 per cent of the total was recovered by the silver smelters of the Province, so that over 19 millions, or 84 per cent of the Ontario production was recovered in the form of bullion within the Province, leaving a balance of 16 per cent treated in United States smelters.

In 1914 over 41 per cent was recovered as bullion in the district, and 36 per cent by the silver smelters, giving a total of 77 per cent, as recovered in the form of bullion within the Province.

While the greater number of the mining companies, hold unrestricted titles to their properties, several are operated on a royalty basis on mining lands owned and leased by the Timiskaming and Northern Ontario Railway Commission. Mr. A. A. Cole, Mining Engineer to the Commission has in his annual report some interesting statistics from which the following tables and extracts have been drawn:—

Ore Shipments from the Cobalt District for the Years 1904 to 1915.

(In Short Tons).

Mine.	1910.	1911.	1912.	1913.	1914.	1915.	Totals 1904-1915.
Badger.....		27.10					27.10
Bailey.....		20.00	41.57	150.35	20.50		388.07
Beaver.....	140.06	790.81	402.97	292.21	392.07	621.63	2,691.13
Buffalo.....	1,185.77	1,275.19	1,251.64	66.13		567.33	7,966.96
Casey-Cobalt.....	48.40	277.74	214.34	401.54	608.30	260.98	1,829.80
Chambers-Ferland.....	885.92	622.85	501.29	223.78	308.06	326.57	3,610.24
City of Cobalt.....	329.40	281.30	230.00	105.14	495.71		2,820.02
Comet Cobalt (Drummond).....	2,194.41	714.83	458.85	610.06	587.03	634.22	7,997.73
Cobalt Lake.....	296.80	2,111.32	1,085.22	1,196.33	919.01		5,930.12
Cobalt Townsite.....	310.99	703.51	1,944.77	2,762.54	1,950.73		8,020.82
Colonial.....	178.60	114.10	86.48	21.56			456.12
Coniagas.....	1,261.46	1,813.89	2,119.87	1,620.40	1,217.26	914.25	13,264.30
Crown Reserve.....	2,814.25	977.32	561.65	791.15	1,067.00	956.14	10,992.38
Foster.....					4.50		822.58
Green Meehan.....		102.98		12.96			251.36
†Hargrave.....	343.68	102.44	17.35				491.92
Hudson Bay.....	260.33	898.88	694.55	609.14	647.95		5,098.25
Imperial Cobalt.....							14.61
Kerr Lake.....	5,088.78	1,292.58	788.10	933.35	628.42	1,080.32	12,178.27
King Edward (Watts).....	134.12	20.00		87.21			776.22
LaRose.....	5,131.53	3,581.54	3,511.40	3,275.14	1,582.54	1,625.54	34,646.04
†Lawson.....							75.73
Lost and Found.....			65.20	8.80			74.00
Lumsden.....				20.00			20.00
McKinley-Darragh.....	2,393.39	3,238.64	2,673.40	2,865.66	2,903.50	1,778.85	20,008.28
Mg. Corporation of Canada.....					756.77	3,785.16	4,541.93
Nancy Helen.....							347.74
Nipissing.....	6,833.81	2,952.20	1,869.27	1,950.22	1,235.07	473.47	30,562.88
North Cobalt.....		3.00					9.87
Nova Scotia.....							778.90
O'Brien.....	608.57	628.44	711.43	703.43	523.21	396.12	10,081.93
*Penn Canadian.....	285.62	22.40	126.35	332.18	460.53	685.30	2,516.71
Peterson Lake Leases.....					122.52		122.52
Gould.....				9.00	50.65		59.65
(Little Nipissing).....	313.76	28.45					422.50
(Nova Scotia).....							121.15
Seneca Superior.....			432.97	457.93	398.96	1,008.80	2,298.66
Provincial.....	52.05	100.54	22.22				250.65
†Princess.....							3.93
Red Rock.....							45.71
Right of Way.....	981.41	666.06	243.24	146.12	184.16	125.43	4,881.07
Rochester.....	28.30						28.30
Silver Bar.....		2.72		20.00	20.00		43.30
Silver Cliff.....	156.84	92.30		48.05			606.69
Silver Leaf.....							252.39
Silver Queen.....			31.25	201.98	105.42	19.69	2,214.92
Timiskaming.....	1,119.12	855.60	967.31	406.26	417.56	552.43	6,169.94
Timiskaming-Cobalt.....							88.45
Trethewey.....	536.64	602.98	579.10	587.54	613.28	124.29	6,858.66
†University.....							231.51
Victoria.....							0.47
Violet.....							36.00
Waldman.....	38.81						38.81
Wyandoh.....	24.15						24.15
Total.....	33,976.97	24,921.71	21,631.79	20,916.16	18,220.71	15,936.52	214,091.44

†The shipment in 1905 was made by the White Silver Mining Co., the former owner of the Hargrave property.

‡Shipments from Lawson, Princess and University, since 1907, included with La Rose.

*Shipments up to the end of 1911 made by the Cobalt Central Mining Company former owner of the Penn Canadian.

Milling in Cobalt during 1915.

Mills and mines.	Tons milled.	TONS OF CONCENTRATES PRODUCED.			Concentration ratio.
		Jigs.	Tables.	Total.	
Beaver.....	28,110	136.3	285.5	421.8	67-1
Buffalo.....	55,697			750.0	74-1
Casey-Cobalt.....	14,061	9.6	247.5	257.1	55-1
Cobalt Lake.....	34,719	233.8	681.5	915.3	37-1
Cobalt Reduction.....	97,132	186.8	1,552.8	1,739.6	56-1
Coniagas.....	54,767	36.0	374.0	410.0	133-1
McKinley-Darragh.....	63,568	269.0	1,447.3	1,716.3	37-1
Northern Customs:—					
La Rose.....	56,472			1,388.0	40-1
Chambers Ferland.....	6,434			314.9	20-1
Right of Way.....	5,755			115.8	49-1
Penn Canadian.....	28,515	139.9	491.2	631.1	45-1
Seneca Superior.....	8,654	145.6	387.6	533.2	16-1
Timiskaming.....	26,927	49.1	338.6	387.7	70-1
Trethewey.....	6,113	7.4	68.9	76.3	80-1
Total.....	486,924			9,657.1	50-1

Cyanide Mills.		Tons of ore treated.	Ounces of bullion produced.
Dominion Reduction:—			
Campbell & Deyell.....		10.0	
Comet (Drummond).....		18,897.5	
Crown Reserve.....		27,201.5	
Dominion Reduction.....		1,537.9	1,537,336.00
Drummond Fraction.....		2,595.5	
Glen Lake.....		2.8	
Kerr Lake.....		28,001.4	
Nipissing, Low Grade.....		77,729.0	2,126,310.76
O'Brien.....		52,883.0	526,272.00
Total.....		206,858.6	4,189,918.76

Total tons milled by water concentrating mills.....	486,924
Total tons milled by cyanide mills.....	206,858
Total tons milled, 1915.....	693,782
" " 1914.....	743,531
" " 1913.....	664,845
" " 1912.....	455,517
" " 1911.....	381,871
" " 1910.....	305,513
" " 1909.....	126,421
" " 1908.....	49,424
Grand Total.....	3,420,904

The total amount of low grade ore treated at the concentrating and cyanide mills, during 1915 was 693,782 tons, as against 743,531 tons in 1914, and 664,845 tons in 1913, a decrease of 6.7 per cent from 1914, while that in 1914 was about 12 per cent higher than the previous year.

At the Buffalo mine, the cyanide plant, which forms part of the low grade mill, treated 10,526 tons of slimes producing 89,696 ounces of silver bullion, as against 9,105 tons producing 67,429 ounces in 1914.

At the high grade mill, 806.5 tons of residues have been re-treated during the year and 30,046 pounds of mercury have been recovered, netting the Company an excellent return. Also 7 tons of raw ore and 459 tons of concentrates were treated, which produced 751,054 ounces of silver bullion.

The Cobalt Reduction mill, of the Mining Corporation of Canada, Ltd., which had extended in 1914, by the addition of a new cyanide plant, treated in 1915, 33,684.21 tons of slimes producing 353,992.19 ounces of silver bullion.

The Nipissing high grade mill treated 1,465 tons of raw ore producing 3,764,394 ounces of silver bullion. The only change made during the year in the high grade ore treatment is an important improvement whereby the large amount of amalgam produced is now re-treated and melted to bullion in one heat in large graphite crucibles, mounted in tilting furnaces.

In the high grade mills at Cobalt, the silver only is recovered, the cobalt, nickel and arsenic being left in the residue for future treatment, or sold for the cobalt content.

In the early days of the Cobalt camp all ores had to be shipped to the United States for treatment. Some Canadian smelters were started which treated high grade ore, and the latest development has been the building of the so-called High Grade Mills at Cobalt, which produce silver bullion by a combination amalgamation—cyanide process.

The 16 per cent of the product still going to the United States consists of some high grade ore along with all the low grade material both ore and concentrates shipped, as the Canadian smelters are not equipped to handle this low material.

Oil Flotation.—The appreciability of concentration by oil flotation to cobalt ores has been demonstrated and a number of companies are now planning oil flotation installations.

The most extensive experimental work has been carried on at the Buffalo mine, where a 50-ton plant was put into operation in the fall of 1915, using the Callow Pneumatic Process, and with such satisfactory results that a new plant with a daily capacity of 600 tons is well under way of installation. The process is one which is particularly applicable to the low grade material which makes up the tailing piles of the camp and will make available for treatment immense tonnages of rock which heretofore have been considered of little or no immediate value.

The following notes are taken from the respective companies' reports:—

Canadian Mining Corporation, Ltd.

Record of production for 12 months ending December 31, 1915:—

Tons of ore broken.....	105,139
" " hoisted.....	127,126
" " treated.....	132,879
Silver content in ounces.....	5,030,753.78
" per ton.....	37.86
" recovered.....	4,209,965.12
Percentage of recovery.....	83.68
Tons of slimes, treated by cyanidation.....	33,684.21
Silver content of slimes, in ounces.....	472,423.78
" recovered from slimes, in ounces.....	353,992.19
Percentage of recovery, in ounces.....	74.93
Total silver recovered, in ounces.....	4,563,957.31
" percentage of extraction.....	90.72
" average silver production per ton of ore, in ounces.....	34.34

The proportion of silver produced from the high grade and shipping ore, as compared with the total silver produced, was 35.9 per cent.

The total production from the Company's mines since the commencement of operations up to December 31, 1915, was 18,671,599 ounces of silver.

The total cost per ton of ore treated was \$10.15 in 1915, as against \$9.16 for the 9 months in 1914, and the cost per ounce of silver was 29.57 cents, as against 30.91 cents in 1914.

The ore reserves estimated at December 31, 1915, are reported as 101,135 tons containing nearly 4 million ounces of silver.

Nipissing Mines Company.

Year ending December 31, 1916:—(Nipissing production only).

Total tonnage of ore produced (high grade 833 tons).....	77,864
" silver produced in ounces.....	4,097,391.17
" net value of production.....	\$2,188,278.91

The high grade mill treated 921 tons of Nipissing ore, averaging 2,474 ounces per ton; the low-grade mill treated 77,071 tons of ore averaging 29.62 ounces per ton, and 112 tons of by-products averaging 1,322.34 ounces per ton, with a total recovery for the low grade mill of 2,127,372 ounces, or an extraction of 87.52 per cent.

The production cost per ounce of silver was 19.06 cents, which is about $\frac{3}{4}$ cent less per ounce than in the previous year.

The ore reserves are reported to contain 9 million ounces of silver and recent developments indicate the possibility of important additions to the reserves.

Coniagas Mines, Ltd.

Year ending October 31, 1915:—

Tons of ore treated.....	55,43
" high grade concentrates shipped.....	473.9
Average silver content, in ounces.....	2,174.6
Tons of low grade slime.....	133.2
Average silver content, in ounces.....	233.3
Tons of mine ore shipped.....	262.2
Average silver content, in ounces.....	3,519.6
Per cent of possible running time.....	98.83

Mill heads averaged 23 ounces per ton, sand tailings from the mill 2.89 ounces per ton, and slime tailings 6.36 ounces.

The silver mined and shipped during the year amounted to a little over a million ounces.

The ore in sight contains over 10 million ounces.

Buffalo Mines Limited.

Year ending April 30, 1916:—

Tonnage of ore treated (included 1,005 tons of sand and slime tailings)	38,157
Tonnage treated by wet concentration.....	30,079
Average silver content, in ounces per ton.....	19.8
Recovery from wet concentration, in ounces.....	431,512
Tonnage treated by combination concentration, and oil flotation.....	8,078
Average silver content, in ounces, per ton.....	25.46
Recovery from combination concentration and oil flotation, in ounces.....	197,601
Tonnage of slime from concentrator cyanided.....	6,340
Average silver content in ounces, per ton.....	10.54
Recovery from slime, in ounces.....	55,161
Silver treated at the amalgamation plant and refinery, in ounces.....	812,020

The total production of bullion from the refinery during the year was 775,253 fine ounces of bullion, and 4.070 ounces of scrap, etc., on hand, making a total of 779,323 fine ounces recovered with residue still to be treated.

The total production of silver for the year amounted to 705,055 ounces.

The ore reserves are 18,000 tons of ore—300,000 tons of tailings, and 3,000 tons of residue from treatment of high grade ore, containing in addition to silver values, cobalt, nickel, and arsenic.

Kerr Lake Mining Company.

Year ending August 31, 1915:—

"The mill treated 23,035 tons of ore, including 2,199 tons taken from the dumps. The grade of the ore was 36.40 ounces per ton, as against 33.83 ounces in 1914.

"The cost of mining was reduced from \$5.09 to \$4.15 per ton.

"The production amounted to 2,036,962 ounces of silver."

British Columbia.

The silver production of British Columbia based on smelter recoveries in 1915 was 3,565,852 ounces valued at \$1,771,658, as against 3,159,897 ounces valued at \$1,731,971 in 1914, an increase of nearly 13 per cent in quantity and 2.3 per cent in value.

The chief sources of the silver production in this Province are the silver-lead ores of the East and West Kootenays supplemented by the silver contained in the gold-copper ores of Rossland, the Boundary, and Coast districts.

The leading silver producers, in order of importance were:—

Silver-Lead Mines: Sullivan, Standard, Hewitt, Blue Bell, Rambler, Cariboo, Slocan Star, Surprise, No. One, Monarch, Florence, Cork-Province, Hudson Bay, and Galena Farm.

Copper-Gold Mines: Granby, Hidden Creek, Centre Star, Le Roi, Britannia, Le Roi No. 2, Rocher Deboule, Mother Lode, and Marble Bay.

Gold-Silver Mines: Union, Jewel, Nickel Plate, and Queen.

In the Minister of Mines Report for British Columbia, for 1915, it is stated that: The Slocan district, including the Ainsworth, Slocan, Slocan City and Trout Lake Mining Divisions—produced about 62·9 per cent of the total provincial output of silver this year, and the Fort Steele Mining Division about 14·3 per cent, all from argentiferous galena. The remainder is chiefly derived from the smelting of copper ores carrying silver.

In 1914 the production was reported as: 59 per cent for the Slocan District, and 13·7 per cent for the Fort Steele Division.

The Slocan and Slocan City Divisions alone produced 53·8 per cent of the total output, as against 49·4 per cent in 1914.

The production of silver by districts is shown in the following table:—

Production of Silver in British Columbia by Districts, 1911-1915.*

(Silver Contents of Ores shipped, in fine ounces.)

—	1911.	1912.	1913.	1914.	1915.
Cariboo—					
Omineca division.....			46,298	135,265	79,155
Cassiar.....	29,976	5,868	4,714	131,509	175,179
Kootenay, East—					
Fort Steel division.....	330,235	376,918	362,311	492,080	481,258
Other divisions.....		7,405	4,756		1,188
Kootenay, West—					
Ainsworth division.....	77,375	301,755	447,015	329,586	289,565
Nelson division.....	76,774	164,182	129,011	150,268	9,405
Slocan division.....	793,926	1,657,105	1,841,226	1,775,975	1,812,550
Trail Creek division.....	88,076	87,530	109,585	136,185	159,584
Revelstoke, Trout Lake, and Lardeau.....	67,884	43,536	23,397	11,295	16,740
Yale—					
Boundary.....	326,849	389,341	394,048	347,981	273,795
Yale division.....	343		461		2,049
Jilloet.....			295	390	5
Coast and other districts.....	100,926	98,468	103,034	91,574	66,033
Total.....	1,892,364	3,132,108	3,465,856	3,602,180	3,366,506

*From the Minister of Mines Reports, British Columbia.

Yukon.

The figures of the silver production of the Yukon given in the following table represent the silver alloyed with the placer gold, together with a certain amount usually small from the lode mines of the district. On an average about one ounce of silver is contained in each five ounces of crude bullion from the alluvial workings.

The comparatively large increase in the production for 1915 is due to the shipments of high grade silver-lead ores from the Silver King property in the Mayo area, north of the Stewart river and referred to under "Lead." With the silver recovery from these ores and from the copper ores of the White Horse district, lode mining produced 79 per cent of the total output—leaving 21 per cent as production from the alluvial workings.

The statistics of silver production since 1909 are given in the following table:—

Annual Production of Silver in the Yukon District.

(In fine ounces).

YEAR.	PLACER.		LODE.		TOTAL.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1909.....	45,000	\$23,176	.....	.....	45,000	\$ 23,176
1910.....	50,000	26,743	37,418	\$20,013	87,418	46,756
1911.....	50,300	26,812	62,408	33,206	112,708	60,078
1912.....	60,302	36,685	20,766	12,633	81,068	49,318
1913.....	63,522	37,980	24,104	14,412	87,626	52,392
1914.....	55,744	30,554	37,229	20,405	92,973	50,959
1915.....	51,706	25,689	196,343	97,552	248,049	123,241

TIN.

Tin ores have not yet been found in sufficient quantities in Canada to be of economic importance.

The occurrence of tin ore has been reported from several localities, the most important, perhaps, being the discovery of cassiterite, near New Ross, Lunenburg county, Nova Scotia. Reports upon it may be found in the Summary Reports of the Geological Survey Branch of the Department of Mines, for 1907, 1908, 1910, 1911, and 1912.

Tin in Black Sands.

During 1913 a sample shipment of one ton of black sand was made from the Atlin district of British Columbia, which is reported to have assayed 6.71 per cent tin. The black sand was obtained from alluvial sluice boxes in this camp. Stream tin has also been found in some of the Yukon placer deposits and a small quantity, recovered in the gold dredging operations, is reported to have been marketed, though no direct returns of production have been obtained.

The imports in 1915 included, tin in blocks, pigs and bars, tin foil, bichloride of tin and strip waste to the amount of 3,920,348 pounds valued at \$1,161,334 and tinware and crystals valued at \$473,462. There is also a large annual import of tin plate, the quantity in 1915 being 90,329,600 pounds, valued at \$2,883,951. The annual imports since 1910 are shown in the following table:—

Annual Imports of Tin.

Calendar Year.	Tin in blocks, pigs and bars.		Tin foil.		(a) Tinware, etc.	Tin crystals.	Bichloride of tin.	
	Pounds.	Value.	Pounds.	Value	Value.	Value.	Pounds.	Value.
1910.....	3,231,100	\$1,058,778	866,751	\$114,602	\$389,040	\$3,903	31,219	\$3,846
1911.....	4,047,500	1,623,670	1,531,877	176,602	461,029	4,370	25,797	3,876
1912.....	4,894,700	2,134,221	1,316,882	183,707	540,599	6,308	36,045	5,595
1913.....	5,085,700	2,252,324	1,074,131	188,779	667,158	8,077	19,114	2,422
1914.....	3,382,700	1,191,466	1,244,628	173,088	650,987	7,759	200	29
1915.....	2,912,600	1,009,597	1,002,413	151,599	463,610	9,852	.....	.....

(a) Tinware, plain, japanned or lithographed, and all manufactures of tin n.e.s.

Prices.—The price of tin in New York was about 50 cents per pound in January, 1913, but contraction in consumption caused a gradual decline throughout the year.

In January, 1914, the price was about 38 cents per pound. After a slight rise it declined to 30·28 cents in October increasing again to 33·60 cents per pound in December, 1914.

In January, 1915, the price of tin was 34·26 cents, and the market was rather dull until the end of March, when, due to a shortage of supply, tin rose to around 49 cents per pound, 48·426 cents being the average for the month. The minimum price was 33·080 cents in October. The average for the year was 38·590 cents, as against 44·252 cents in 1914.

TUNGSTEN.

No production of tungsten is reported during 1915.

Scheelite was discovered in Halifax county, Nova Scotia, in 1908. Mr. Faribault, of the Geological Survey, visited this deposit again in 1909, and a preliminary report thereon will be found in the Summary Report of the Geological Survey for 1909, pages 228 to 234. During 1910 and 1912 these deposits were developed by the Scheelite Mines, Limited, who constructed a mill and made a shipment of 14 tons of tungsten concentrates—the first shipment from Nova Scotia—carrying 72 per cent tungstic acid.

The occurrence of wolframite has also been noted in association with molybdenite, by Dr. Walker, in New Brunswick, near the confluence of Burnt Hill brook and southwest Miramichi river. The property was tested by Mr. Freeze, of Doaktown, New Brunswick, and Mr. Matthew Lodge, of Moncton, who formed the Acadia Tungsten Mines Company. This Company has done a little development.

Prices.—"The market for tungsten ore during the first quarter of 1915 was very poor, \$6 to \$9 per unit. During April and May the Allies placed enormous orders for war requirements; the price reached \$10.00 per unit and continued rising by leaps and bounds.

"Large quantities of tungsten ore were booked in December at \$44.00 per unit and also at \$50.00 per unit. Ammunition buyers have paid as much as \$62.50 per unit, or even more.

"The value of tungsten metal advanced from 60 cents per pound to \$7.00 per pound during the year. Tool steel that used to be worth about 70 cents per pound is eagerly bought at \$3.00 per pound."*

*From "Engineering and Mining Journal," p. 144, January 15, 1916.

ZINC.

The production of zinc ore in Canada in 1915, as obtained by direct returns from producers, was 14,895 tons, valued at \$554,938, as against 10,893 tons, valued at \$262,563 in 1914. The zinc content of these shipments was returned as 12,231,439 pounds, which, if valued at the average New York price of spelter during the year—13·230 cents, would be worth \$1,618,219, as against 9,101,460 pounds, valued at 5·213 cents per pound, or with a total value of \$474,459 in 1914.

The greater part of this production is from British Columbia and the ore shipped contains also a varying silver content, for which payment is made by the smelters, and without which, on account of the import duty to the United States and the long rail haul, it would not in many cases pay to ship. The Slocan mining division produced about $\frac{1}{3}$ of the total output—Nelson about $\frac{1}{5}$, and the balance came mostly from the Ainsworth and Fort Steele divisions.

In Quebec, the property at Notre Dame des Anges, Portneuf, which is being operated by the Weedon Mining Company, shipped several hundred tons of ore.

Statistics of the production of zinc since 1898 are given in the following table:—

Annual Production of Zinc.

Year.	ZINC ORE SHIPPED.		METALLIC ZINC IN ORE SHIPPED.	
	Tons.	Spot value.	Pounds.	Final value.
1898.....	1,162	\$ 11,000	788,000	\$ 36,011
1899.....	865	18,165	814,000	46,805
1900.....	261	4,810	212,000	9,342
1901.....				
1902.....	158	1,659	142,200	6,882
1903.....	1,000	10,500	900,000	48,660
1904.....	597	3,700	477,568	24,256
1905.....	9,413	139,200	*	*
1906.....	1,154	23,800	*	*
1907.....	1,573	49,100	*	*
1908.....	452	3,215	*	*
1909 (a).....	18,371	242,699	16,468,204	906,245
1910.....	5,063	120,003	4,361,712	240,766
1911.....	2,590	101,072	2,346,849	135,132
1912.....	6,415	215,149	5,354,700	371,777
1913.....	7,889	186,827	7,069,800	399,302
1914.....	10,893	262,563	9,101,460	474,459
1915.....	14,895	554,938	12,231,439	1,618,219

*Figures not available.

(a) Includes 7,424 tons shipped late in 1908.

During 1913 the new United States customs tariff came into effect considerably reducing the duties payable on Canadian ores, the new items affecting Canadian shipments being:—

Zinc ores containing 25 per cent or more zinc: 10 per cent on zinc contained therein.

Lead bearing ore: $\frac{3}{4}$ cent per pound on lead contained therein.

Although not paid for by the United States smelters, the lead in ore is considered as dutiable and as there is often a small lead content in the zinc ore or concentrates shipped, the lead duty applies. The result of the decreased duties has been a considerable increase in zinc shipments.

There is also a duty of 15 per cent on metallic zinc exported to the United States, and at present an import duty of $7\frac{1}{2}$ per cent on zinc and other materials imported into Canada from the United States.

The price of spelter in New York varied between a minimum of $5\frac{3}{4}$ cents per pound in January and a maximum of 25 to 27 cents in June, the price at the close of the year being from $15\frac{1}{4}$ to $16\frac{3}{4}$ cents and the average for the year 13·230 cents per pound.

The price of high-grade spelter rose from 10 cents at the beginning of the year to over 40 cents in midsummer and was maintained fairly strongly through the balance of the year at from 35 to 40 cents.

Average Price of Spelter at New York.*

(In Cents per Pound.)

Month.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.
January.....	6·190	6·487	6·732	4·513	5·141	6·101	5·452	6·442	6·931	5·262	6·386
February.....	6·139	6·075	6·814	4·785	4·889	5·569	5·518	6·499	6·239	5·377	8·436
March.....	6·067	6·209	6·837	4·665	4·757	5·637	5·563	6·626	6·078	5·250	8·541
April.....	5·817	6·087	6·687	4·645	4·965	5·439	5·399	6·633	5·641	5·113	10·012
May.....	5·434	5·997	6·441	4·608	5·124	5·191	5·348	6·679	5·406	5·074	14·781
June.....	5·190	6·096	6·419	4·543	5·402	5·128	5·520	6·877	5·124	5·000	21·208
July.....	5·396	6·006	6·072	4·485	5·402	5·152	5·695	7·116	5·278	4·920	19·026
August.....	5·706	6·027	5·701	4·702	5·729	5·279	5·953	7·028	5·658	5·568	12·781
September.....	5·887	6·216	5·236	4·769	5·796	5·514	5·869	7·454	5·694	5·380	13·440
October.....	6·087	6·222	5·430	4·801	6·199	5·628	6·102	7·426	5·340	4·909	12·800
November.....	6·145	6·375	4·925	5·059	6·381	5·976	6·380	7·371	5·229	5·112	15·962
December.....	6·522	6·593	4·254	5·137	6·249	5·624	6·301	7·162	5·154	5·592	15·391
Year.....	5·822	6·198	5·962	4·726	5·503	5·520	5·758	6·943	5·648	5·213	13·230

*From the Engineering and Mining Journal, N.Y., Feb. 5, 1916.

Average Prices of Spelter, Ordinary Brands, in London.*

(In pounds per ton.)

Month.	1906.	1907.	1908.	1909.	1910.
January.....	28 8 2	27 7 1	20 6 3	21 6 3	23 4 3
February.....	26 2 4	26 1 5	21 0 7	21 8 9	23 3 1
March.....	24 15 3	26 4 8	21 1 5	21 8 8	23 3 7
April.....	25 19 3	25 17 5	21 6 1	21 10 1	22 9 11
May.....	27 0 2	25 14 2	20 2 10	21 19 1	22 1 1
June.....	27 9 9	24 10 2	19 2 2	21 19 11	22 3 2
July.....	26 15 11	23 18 11	18 14 1	21 18 9	22 5 6
August.....	27 0 5	22 1 7	19 6 9	22 0 3	22 14 0
September.....	27 12 5	21 0 11	19 10 3	22 17 1	23 2 7
October.....	27 18 10	21 12 11	19 15 1	23 3 4	23 16 6
November.....	27 15 1	21 8 4	20 17 1	23 2 1	24 1 9
December.....	27 19 3	20 3 3	20 19 2	23 1 3	23 17 7
Year.....	27 1 5	23 16 9	20 3 6	22 2 11	23 0 0
Month.	1911.	1912.	1913.	1914.	1915.
January.....	23 16 7	26 9 11	25 19 1	21 6 6	30 16 1
February.....	23 3 10	26 6 5	25 4 3	21 7 6	39 16 4
March.....	22 19 2	25 19 11	24 11 4	21 7 7	44 2 7
April.....	23 13 8	25 8 11	25 2 4	21 10 2	49 17 9
May.....	24 6 1	25 11 2	24 10 4	21 5 9	67 19 0
June.....	24 9 7	25 11 11	21 19 10	21 6 0	100 12 3
July.....	24 13 10	25 13 1	20 11 2	21 6 7	97 5 0
August.....	26 11 2	26 1 2	20 14 0	29 0 9	67 15 9
September.....	27 12 7	26 17 0	21 3 10	25 14 0	67 17 9
October.....	27 4 10	27 5 10	20 13 9	23 13 6	66 10 11
November.....	26 13 2	26 14 3	20 14 4	24 14 10	85 6 4
December.....	26 13 7	26 0 4	21 6 8	27 6 10	82 4 1
Year.....	25 3 2	26 3 3	22 14 3	23 6 8	66 13 8

*From the annual publication of the "Metal Information Bureau," London, E.C.

The imports of zinc, which may be taken as an index of consumption, show a fairly steady increase and amounted in 1915 to 15,919,500 pounds of zinc in blocks or pigs, spelter and tubing, valued at \$2,010,602; 12,251,257 pounds of zinc white, zinc dust, zinc sulphate and chloride of zinc, valued at \$743,045; and manufactures of zinc, valued at \$21,711.

The total value of the imports in 1915, of brass, which alloy contains about 30 per cent zinc, was \$3,177,942 and was made up as follows: brass in blocks, pigs or ingots 1,677,800 pounds, valued at \$226,499; "old and scrap," tubing and plain wire, 2,133,148 pounds, valued at \$487,911; brass in bars and rods and strips, sheets or plates, valued at \$450,372; brass caps for electric batteries, caps for shells, wire cloth, nails and tacks and handpumps, valued at \$606,484; and other manufactures of brass, valued at \$1,406,676.

The imports of zinc during 1914 were valued at \$1,174,297 and included 14,006,300 pounds of zinc in blocks, pigs, spelter and tubing, valued at \$740,816; 10,160,221 pounds of zinc white, zinc dust, zinc sulphate and chloride of zinc, valued at \$433,481; and manufactures of zinc, valued at \$36,355.

The imports of brass during 1914 were valued at \$2,858,088 and included, brass in blocks, pigs or ingots 1,010,600 pounds, valued at \$126,357; "old and scrap," tubing and plain wire 3,368,880 pounds, valued at \$525,005; brass in bars and rods (free), 1,747,700 pounds valued at \$285,656; and also brass in bars and rods and strips, sheets or plates, valued at \$205,560 brass caps for electric batteries, caps for shells, wire cloth, nails and tacks, and handpumps, valued at \$269,612; and other manufactures of brass, valued at \$1,445,898.

The estimated zinc contents of zinc products and of brass imported during the past two years is shown in the following table according to which the consumption of zinc during 1915 amounted to at least 13,389 tons together with the zinc contents of manufactures of zinc and of brass which would probably not exceed 1,000 tons.

The zinc imports during 1912 amounted to over 16,000 tons of metal and according to the Customs records, exceed the imports during 1914 and 1915.

Summary of Imports of Zinc and Zinc Products in 1914 and 1915. Imports of Zinc.

Zinc and Zinc products.	1914.			1915.		
	Product in pounds.	Value of products.	Zinc content in pounds.	Product in pounds.	Value of product.	Zinc content in pounds.
Zinc, in blocks, pigs and sheets.....	3,160,900	\$ 189,785	3,160,900	1,653,700	\$ 226,104	1,653,700
" as spelter.....	10,845,400	551,031	10,845,400	14,265,700	1,784,471	14,265,700
" seamless tubing..	.....	.....	100	27	.....	100
" white.....	9,445,397	389,796	(80%) 7,556,318	11,368,569	656,132	(80%) 9,094,855
" dust.....	362,109	34,295	(90%) 325,898	503,143	70,823	(90%) 452,829
" sulphate and chloride of.....	352,715	9,390	(44%) 155,195	379,545	16,090	(44%) 167,000
Total.....	24,166,521	\$1,174,297	22,043,711 (11,021·8 tons)	28,170,757	\$2,775,331	25,634,184 (12,817·1 tons).
" as manufacture of.....	.....	\$36,355	.....	.....	\$21·711	.....
Brass in blocks, pigs & ingots.....	1,010,600	\$ 126,357	(30%) 303,180	1,677,800	\$226,499	(30%) 503,340
" old and scrap....	1,407,900	150,346	" 422,370	311,900	41,971	" 93,570
" tubing.....	1,590,573	314,675	" 477,172	1,381,482	349,988	" 414,445
" plain wire.....	370,407	59,984	" 111,122	439,766	95,952	" 131,930
" bars and rods (free).....	1,747,700	285,656	" 524,310	.....	.....	.....
Total.....	6,127,180	\$937,018	1,838,154 (919·1 tons).	3,810,948	\$714,410	1,143,285 (571·6 tons).
Brass, bars and rods.	.....	\$ 94,827	.....	.....	\$215,782	.....
" strips, sheets or plates.....	.....	110,733	.....	.....	234,590	.....
" wire cloth n.o.p.	.....	120,614	.....	.....	147,464	.....
" cups for manuf. of shells.....	.....	124,622	.....	.....	435,161	.....
" caps for electric batteries.....	.....	5,684	.....	.....	5,367	.....
" hand-pumps.....	.....	11,956	.....	.....	10,930	.....
" nails, tacks, etc.	.....	6,736	.....	.....	7,562	.....
" other manufactures n.o.p....	.....	1,445,898	.....	.....	1,406,676	.....
Total.....	.....	\$1,921,070	.....	.....	\$2,463,532	.....

Imports of Zinc.

Fiscal Year.	In blocks, pigs and sheets.		As spelter.		As manufac- tures of zinc.	Seamless tubing.	
	Cwt.	Value.	Cwt.	Value.	Value.	Pounds.	Value.
1880.....	13,805	\$ 67,881	1,073	\$ 5,301	\$ 8,327		
1881.....	20,920	94,015	2,904	12,276	20,178		
1882.....	15,021	76,631	1,654	7,779	15,526		
1883.....	22,765	94,799	1,274	5,196	22,599		
1884.....	18,945	77,373	2,239	10,417	11,952		
1885.....	20,954	70,598	3,325	10,875	9,459		
1886.....	23,146	85,599	5,432	18,238	7,345		
1887.....	26,142	98,557	6,908	25,007	6,561		
1888.....	16,407	65,827	7,772	29,762	7,402		
1889.....	19,782	83,935	8,750	37,403	7,233		
1890.....	18,236	92,530	14,570	71,122	6,472		
1891.....	17,984	105,023	6,249	31,459	7,178		
1892.....	21,881	127,302	13,909	62,550	7,563		
1893.....	26,446	124,360	10,721	49,822	7,464		
1894.....	20,774	90,680	8,423	35,615	6,193		
1895.....	15,061	63,373	9,249	30,245	5,581		
1896.....	20,223	80,784	10,897	40,548	6,290		
1897.....	11,946	57,754	8,342	32,826	5,145		
1898.....	35,148	112,785	2,794	13,561	10,503		
1899.....	18,785	107,477	5,450	29,687	14,661		
1900.....	28,748	156,167	5,836	29,416	11,475		
1901.....	20,527	103,457	14,621	58,283	6,882		
1902.....	34,871	141,560	18,356	80,757	6,683		
1903.....	26,646	142,827	23,159	110,817	9,754		
1904.....	25,553	138,057	33,952	164,751	12,682		
1905.....	25,141	141,514	37,941	206,244	11,912		
1906.....	24,462	158,438	50,137	290,686	12,917		
Calendar Year.							
1907.....	30,130	198,570	58,430	348,810	21,812	670	\$ 53
1908.....	24,273	130,689	54,780	254,225	14,577		
1909.....	35,283	199,016	120,615	592,148	16,073		
1910.....	31,660	191,051	109,084	561,170	21,829		
1911.....	33,678	206,859	116,996	654,097	30,862		
1912.....	100,095	617,836	117,845	686,585	46,336		
1913.....	47,226	291,368	126,051	661,207	54,898		
1914.....	31,609	189,785	108,454	551,031	36,355		
1915.....	16,537	226,104	142,657	1,784,471	21,711	100	27

Imports of Zinc White, Zinc Dust, and Zinc Sulphate and Chloride.

Calendar Year.	Zinc white.		Zinc dust.		Zinc, sulphate and chloride of.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
1910.....	8,496,399	\$312,779	97,461	\$ 4,859	237,466	\$ 6,470
1911.....	8,537,498	314,194	86,242	5,718	414,500	15,930
1912.....	10,505,944	425,714	308,239	18,944	941,780	29,104
1913.....	12,682,126	525,643	412,294	26,403	634,634	17,424
1914.....	9,445,397	389,796	362,109	34,295	352,715	9,390
1915.....	11,368,569	656,132	503,143	70,823	379,545	16,090

British Columbia.—The annual production of zinc in British Columbia, by districts, showing zinc contents of ores shipped during the past five years, as recorded by the Provincial Bureau of Mines, is presented in the next table.

According to the Provincial Mineralogist,—“The total quantity of zinc produced in 1915 was 12,982,440 pounds of which 8,684,572 pounds came

from the Slocan District; 3,127,209 pounds from Nelson Division; 678,940 pounds from Ainsworth Division, and 491,719 pounds from East Kootenay.

"The largest producer in the Province was the Standard, in Slocan Division, which is credited with 3,778,857 pounds, followed by the H.B., in Nelson Division, with 2,387,514 pounds, and the Silverton Mines, Slocan, with 1,385,859 pounds; while the Zincton mine, in Nelson District, produced 739,695 pounds; the J. L. Retallack Mines, in Ainsworth 576,000 pounds; the Lucky Jim in Slocan 788,158 pounds; and the Rambler-Carriboo 540,660 pounds."

It is also pointed out that the supply of ore brought out by the extraordinary high prices quoted for spelter "was so great that such smelters as were equipped to handle it only bought at a very large margin of profit so that the zinc miner did not make as great profits as the increased market price of the metal would seem to indicate."

Production of Zinc in British Columbia by Districts, 1911-1915.

(Contents of ore shipped in pounds).

—	1911.	1912.	1913.	1914.	1915.
Kootenay, East—					
Fort Steele division.....					180,000
Other divisions.....		142,643			311,719
Kootenay, West—					
Ainsworth division.....			150,680	280,000	678,940
Nelson division.....				332,003	3,127,209
Slocan division.....	2,634,544	5,215,637	6,608,088	7,254,464	8,684,572
	2,634,544	5,358,280	6,758,768	7,866,467	12,982,440

*From the Minister of Mines Reports, British Columbia.

World's Production of Spelter in Short Tons.*

Country.	1908.	1909.	1910.	1911.	1912.	1913.
Australia.....	1,198		560	1,904	2,531	4,105
Austria and Italy.....	14,063	13,931	14,666	18,602	21,609	23,928
Belgium.....	181,851	184,194	190,233	215,050	220,678	217,928
France and Spain.....	61,512	61,859	65,191	79,791	79,543	78,289
Germany.....	239,062	242,594	251,046	276,008	298,794	312,075
Great Britain.....	60,029	65,422	69,531	73,803	63,086	65,197
Holland.....	19,017	21,548	23,121	25,059	26,380	26,811
Poland.....	9,740	8,758	9,514	10,952	9,659	8,389
United States.....	210,424	255,760	269,184	286,526	338,806	346,676
Norway.....				7,363	8,959	10,237
Total.....	796,896	854,066	893,046	986,058	1,070,045	1,093,635

*Mineral Resources of the United States.

World's Consumption of Spelter in Short Tons.*

Country.	1908.	1909.	1910.	1911.	1912.	1913.
Austria-Hungary.....	35,935	36,155	37,258	47,950	51,588	44,533
Belgium.....	74,956	71,209	84,326	81,240	85,098	84,216
France.....	85,869	73,744	62,059	90,389	90,389	89,286
Germany.....	198,634	207,343	203,374	241,734	248,899	255,734
Great Britain.....	152,669	171,408	195,989	193,674	204,146	214,508
Holland.....	4,189	4,409	4,409	4,409	4,409	4,409
Italy.....	9,259	9,039	8,929	11,133	11,795	12,015
Russia.....	19,621	20,282	27,447	31,856	30,754	36,707
Spain.....	5,512	4,960	4,630	5,291	5,181	6,503
United States.....	214,167	270,730	245,884	280,059	340,372	295,370
Other countries.....	11,023	9,921	13,669	19,621	21,715	23,038
Total.....	811,834	879,200	887,974	1,007,356	1,094,346	1,066,319

*Mineral Resources of the United States.

There are now in Canada three companies constructing, or operating, electrolytic plants, viz: The Electro Zinc Company at Welland, which uses the Watt's process; the French Complex Ore Reduction Company at Nelson, using the French process; and the Consolidated Mining and Smelting Co. of Canada, Ltd., at Trail, which Company has erected a large plant and is increasing its capacity so as to treat, it is reported, about 60 tons per day.

In December of 1915 these operations with the possible exception of Trail, were still in the experimental stages of development. The Welland plant was designed to recover refined zinc from zinc oxide although it was ultimately intended to extend the operations to include the reduction of zinc ores from Notre Dame des Anges, in Quebec.

The French Complex Ore Reduction Company conducted a further demonstration of the "French" process at the Standard Silver Lead Mining Company's mill at Silverton. Satisfactory results were claimed although operations were discontinued.

The "Daily Colonist" of Victoria, on Sept. 12, 1915, reported: "that the Provincial Government had decided to extend a measure of financial assistance to the French Complex Ore Reduction Company, so that a demonstration plant of some practical usefulness may be established at Nelson; also to lease to the Company, on favorable terms the old Government plant.

"The Government was extending a measure of aid to the Company in view of the possibility of encouraging the greater production of zinc in British Columbia, a matter of vital concern to the Imperial Government, in view of the use of zinc in the manufacture of munitions of war."

During 1916 a Government Bill was introduced in the Provincial Legislature, to guarantee bonds of the French Complex Ore Reduction Company, to the amount of \$40,000.

At Trail "considerable experimental work was carried on during the year in the production of electrolytic zinc, and spelter of a good grade has been produced at the rate of about one-half ton per day from zinc contained in the Sullivan ore. The results have been promising enough to warrant the building of a larger plant, and, on account of exceptional circumstances, a plant of twenty-five to thirty-five tons capacity of spelter per day has been designed and is now being erected. It is hoped that this will be in operation early in the year.

"The operation of this plant should make available a very large amount of complex ore at the Sullivan mine, and the extraction of this ore will probably lead to the development of further bodies of lead ore in the same mine."

The Trail plant started regular commercial operations early in 1916 and in July was reported to be producing 20 tons per day.

In August, 1915, the Dominion Government announced, as follows, its intention to provide a measure of assistance toward stimulating the establishment of a zinc smelting industry in Canada. "A Committee of the Government under the chairmanship of the Minister of Finance, after full discussion with members of the Shell Committee, has satisfactorily solved the problem of ensuring at reasonable prices a Canadian supply of zinc suitable for use in the production of brass for the making of quick-firing cartridge cases for shells. Before the outbreak of war this quality of zinc sold at about eight cents per pound. Since that time the price has steadily risen as high as forty cents and grave fears were entertained that the supply might be entirely cut off. At present the sources of supply are outside of Canada. The Shell Committee, representing the British Government in the purchase of shells in Canada, regarded it as absolutely necessary that there should be supplies of this zinc within Canada. Canadian producers were unwilling to go to the large expense of installing refineries unless insured against the fall in zinc prices which is inevitable after the close of the war. After considerable negotiation the Government decided to offer a limited bounty for the production in Canada of zinc."

An Act to provide for the payment of bounties on zinc produced from zinc ores mined in Canada was passed by the House of Commons of Canada, May 3rd, 1916, and reads as follows:—

"An Act to provide for the payment of Bounties on Zinc produced from Zinc Ores mined in Canada.

"His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

"1. This Act may be cited as The Zinc Bounties Act, 1916.

"2. Whenever it appears to the satisfaction of the Minister of Trade and Commerce who is charged with the administration of this Act, that the standard price of zinc or spelter in cakes, stocks or pigs, in London, England, is less than £36 19s. 3d. sterling, per ton of two thousand two hundred

and forty pounds, the Governor in Council may authorize the payment out of the Consolidated Revenue Fund of a bounty on zinc or spelter, containing not more than two per cent of impurities, produced in Canada, at the time the price is as hereinbefore stated, from zinc ores mined in Canada. Such bounty shall be equal to the difference between such standard price per ton and £36 19s. 3d. per ton, but shall in no case exceed two cents per pound, and in no event shall any bounty be paid when the price received for such zinc and spelter by the producer is eight cents or more per pound."

"3. No bounty shall be payable under this Act on zinc or spelter produced during the continuation of the war, and in no event shall bounty be payable on zinc or spelter produced after the thirty-first day of July, one thousand nine hundred and seventeen."

"4. The total amount payable under the provisions of this Act shall not exceed the sum of \$400,000."

"5. The Governor in Council may make regulations for carrying out the provisions of this Act."

Electrolytic Zinc Plants in Canada.

Company.	Location of plant.	Remarks.
Consolidated Mining and Smelting Co. of Canada, Ltd.....	Trail, B.C.....	Capacity of plant, 35 tons of refined zinc per day being increased to 60 tons per day.
Electro Zinc Company, Ltd	Welland, Ont.....	Experimental in 1915. Small plant for recovery of zinc from zinc oxide.
French Complex Ore Reduction Company.....	Nelson, B.C.....	Experimental. Small demonstrations at Nelson, B.C.

Electrolytic Zinc Plants in the United States.*

Company.	Location of plant.	Daily spelter capacity.	Remarks.
American Smelting and Refining Co....	Omaha, Nebr.....	Experimental....	Operated in 1915.
Anaconda Copper Mfg. Co.....	Garfield, Utah.....	10 tons.....	Planned.
	Anaconda, Mont....	25 tons.....	Under construction; 10 tons operated in 1915.
Bully Hill Copper Co.....	Great Falls, Mont..	100 tons.....	Under construction.
	Bully Hill, Cal.....	Experimental....	Operated in 1915.
Daly-Judge Mining Co.....	Park City, Utah....	10 tons.....	Under construction.
Electrolytic Zinc Co.....	Baltimore, Md.....	15 tons.....	"
		10 tons.....	Under construction; 2½ tons now in operation.
Mammoth Copper Mfg. Co.....	Kennett, Cal.....	Experimental....	Operated in 1915.
Northwestern Metals Co.....	Helena, Mont.....	Ore capacity 100 tons.	Malm process; not operated in 1915.
Reed Zinc Co.....	Palo Alto, Cal.....	Experimental....	Operated in 1914-15.
River Smelting and Refining Co.....	Keokuk, Iowa.....	"	Operated in 1915.
Western Metals Co.....	Georgetown, Colo..	Ore capacity 100 tons.	Malm process; under construction.

*As published by the United States Geological Survey, April 4, 1916.

**Active Zinc Smelters in the United States, and Capacity in 1916,
by Companies and States.***

Company.	Location.	Acid plants.	Retorts at close of 1915.	Retorts June 30 1916.	Additional retorts contemplated or under construction.
Fort Smith Spelter Co.....	Fort Smith, Ark..			2,560	
Arkansas Zinc Co.....	Van Buren, "			2,400	
United States Zinc Co.....	Pueblo, Colo.		2,208	1,944	
American Zinc Co. of Illinois...	Hillsboro, Ill.	A	4,000	4,864	
Collinsville Zinc Sm. Co.	Collinsville, " ..		1,792	2,304	
Granby Mg. & Sm. Co.	E. St. Louis	A	3,220	3,220	2,400
Hegeler Zinc Co.	Danville, "		3,600	5,400	
Illinois Zinc Co.	Peru, "	A	4,640	4,640	800
Matthiessen & Hegeler Zinc Co.	La Salle, "	A	6,168	6,168	
Missouri Zinc Co.	Beckemeyer, " ..		352	352	
Mineral Pt. Zinc Co.	Depue, "	A	9,068	9,068	
National Zinc Co.	Springfield, " ..	A	3,200	4,480	
Robt. Lanyon Z. & Acid Co.....	Hillsboro, "	A	1,840	3,200	
Sandoval Zinc Co.	Sandoval, "		672	672	
American Spelter Co.....	Pittsburgh, Kan.		896	992	
American Zinc, Lead & Smelting Co.....	Caney, "		6,080	6,080	
" " "	Dearing, "		4,480	4,480	
Chanute Spelter Co.	Chanute, "		1,280	1,280	
Cherokee Smelting Co.	Bruce, "		896	896	
Edgar Zinc Co.	Cherryvale, " ..		4,800	4,800	
Granby Mg. & Sm. Co.	Neodesha, "		3,760	3,760	
Iola Zinc Co.	Concreto, "		660	1,320	
Joplin Ore & Spelter Corporation	Pittsburgh, "		1,444	1,792	
Lanyon Smelting Co.	" "		448	448	
Owen Zinc Co.	Caney, "		1,280	1,280	640
Pittsburg Zinc Co.	Pittsburgh, " ..		910	910	
Prime Western Spelter Company	Gas, "	A	4,868	4,868	
U.S. Smelting Co.	Altoona, "		3,960	4,600	
" " "	Iola, "		3,440	3,440	
" " "	La Harpe, "		1,924	1,924	
Weir Smelting Co.	Weir, "				448
Edgar Zinc Co.	St. Louis, Miss.		2,000	2,000	
Miss. Zinc Sm. Co.	Rich Hill, "			448	
Nevada Smelting Co.	Nevada, "		672	672	
Bartlesville Zinc Co.	Bartlesville, Okla.		5,184	6,336	
" " "	Blackwell, "			1,600	4,800
" " "	Collinsville, " ..		10,752	13,440	
Bartlesville Zinc Co.	Bartlesville, " ..		3,456	3,456	
(Lanyon-Starr Plant).....	Henryetta, "				4,000
Eagle-Picher Lead Co.	" "			3,000	
Henryetta Spelter Co.	" "			2,560	2,560
J. B. Kirk Gas & Sm. Co.	Checotah, "		3,720	3,720	
Kusa Spelter Co.	Kusa, "			4,000	
La Harpe Spelter Co.	" "		4,970	4,970	
National Zinc Co.	Bartlesville, " ..			1,600	1,340
Oklahoma Spelter Co.	Kusa, "				
Quinton Spelter Co.	Quinton, "				
Tulsa Fuel & Mfg. Co.	Collinsville, " ..		6,232	6,232	
U.S. Zinc Co.	Sand Springs, " ..		5,680	8,000	
American Steel & Wire Company	Donora, Penn.	A	3,648	9,120	
American Zinc & Chemical Co....	Langeloth, "	A	3,648	6,384	912
N. J. Zinc Co. (of Pennsylvania) ..	Palmerton, "		6,720	6,960	
Clarksburg Zinc Co.	Clarksburg, W. Va.		3,648	3,648	
Grasselli Chemical Co.	" "	A	5,760	5,760	
" " "	Meadowbrook, " ..	A	8,592	8,592	
United Zinc Smelting Corporation	Moundsville, " ..	A			6,912
Total, for all States.			156,568	196,640	24,812
Plants with special retorts:—					
Michael Hayman & Co.,					
Buffalo, N.Y.			12	12	
Trenton Sm. & Refining Co.,					
Trenton, N.J.			96	60	
Wm. Cramp & Sons Ship & Engine Bldg. Co., Phila-					
delphia, Pa.			32	32	

*United States Geological Survey, Press Bulletin No. 285, August, 1916.

NON-METALLIC PRODUCTS.

¹ A recent publication of the Mines Branch of the Department of Mines, gives a collection of interesting data with regard to the non-metallic minerals used in Canadian manufacturing industries, indicating the sources of these non-metallic minerals, and the various uses to which they are put.

ABRASIVES.

The abrasives produced in Canada are: corundum, the various sand-stone abrasives, as grindstones, pulpstones, scythestones, etc., and tripolite, or infusorial earth.

Corundum.

The 1915 production of grain corundum was the lowest since 1901, amounting to only 523,305 pounds, valued at \$33,138, or an average price of 6.33 cents per pound. This is about half of the 1914 production, which was 1,095,500 pounds, valued at \$72,176 or an average of 6.59 cents per pound. Sales in Canada were 41,700 pounds or 8 per cent, and sales for export were 481,605 pounds or 92 per cent of the year's production.

Grain corundum to the amount of 232,330 pounds was recovered from 1,724 tons of rock milled, a recovery of 6.7 per cent. The recovery in 1914 was 5.7 per cent, in 1913, 6.2 per cent, and in 1912 it was 4.4 per cent. The recovery of corundum during the earlier years of the industry was about 10 per cent, but during recent years has fallen as low as 3.9 per cent, a much lower grade of rock being now milled than heretofore.

Statistics concerning the annual production are given in the following table:—

Production of Corundum Ore and Corundum.

Cal- endar Year.	Corundum- bearing rock treated.	Grain corundum graded.	Grain corundum sold in Canada.	Grain corundum exported.	Total of grain corundum.	Value.	Average price per pound.
	Tons.	Tons.	Tons.	Tons.	Tons.	\$	Cts.
1900.....		60	3		3	300	5.00
1901.....	4,134	444	85	302	387	46,415	5.97
1902.....	7,996	806	106	662	768	84,465	5.49
1903.....	(a) 8,877	839	85	618	703	77,510	5.51
1904.....	28,187	1,654	116	877	993	109,545	5.51
1905.....	23,571	1,681	140	1,504	1,644	149,153	4.48
1906.....	45,719	2,914	162	2,112	2,274	204,973	4.50
1907.....	60,532	2,682	164	1,728	1,892	177,922	4.70
1908.....	2,678	106	99	990	1,089	100,398	4.60
1909.....	35,894	1,579	129	1,362	1,491	162,492	5.45
1910.....	37,183	1,686	106	1,764	1,870	198,680	5.31
1911.....	41,795	1,641	92	1,380	1,472	161,873	5.50
1912.....	36,879	1,620	63	1,897	1,960	239,091	6.10
1913.....	12,290	763	23	1,154	1,177	137,036	5.82
1914.....	12,111	695	14	534	548	72,176	6.59
1915.....	1,724	116	21	240	262	33,138	6.33

(a) In addition to this amount which was milled in Canada, 267 tons of ore were mined and shipped to the United States for treatment there.

¹ "Non-Metallic Minerals in Canadian Manufacturing," Frechette, Mines Branch, Department of Mines Ottawa, 1914, No. 305.

Corundum is found in an area embracing several townships in Renfrew and Hastings counties in the Province of Ontario. The industry made its appearance there in 1900, the production reaching a maximum in 1906. From 1907 to 1913 the yearly production was smaller but fairly uniform.

The Manufacturers Corundum Company has been the only operator for the last six years.

Only a small proportion of the graded grain corundum is sold in Canada. The balance goes to the United States, Great Britain, France, and Germany.

Detailed information concerning the mines and mills of the corundum district will be found in the Annual Reports of the Ontario Bureau of Mines, and in the Geological Survey publications.¹ The treatment of the corundum-bearing rock consists of crushing, concentration, magnetic separation of the iron, air separation of the mica, and sizing. The magnetic sand finds a sale for use in the manufacture of school black-boards.

Grindstones, Pulpstones, Etc.

The total production of grindstones, pulpstones, and scythestones for 1915 was 2,580 tons, valued at \$35,768, as compared with a production in 1914 of 3,976 tons, valued at \$54,504, which is a decrease of 35 per cent.

The production as usual, was confined to Nova Scotia, and New Brunswick. Reports were made by four operating companies, the quarries reporting sales being located at Mic Mac Point and Quarry Island, Pictou county, N.S., at Stonehaven and Clifton, Gloucester county, at Quarryville, Northumberland county, and at Woodpoint, Westmorland county, N.B.

The grindstones are shipped chiefly in the finished condition and are marketed in Canada, Newfoundland, and the United States, the price realized being around \$12 to \$13 per ton. A number of pulpstones are sold each year. Scythestones, both finished and in the rough are also shipped as well as occasionally small quantities of grit for marble polishing.

The output of pulpstones comes from the Miramichi Quarry Company's property at Quarryville, Northumberland county, N.B. The Company's most important product, however, is an excellent building stone for which a market has been built up in Ontario and Quebec.

¹ "The Geology of the Haliburton and Bancroft Area," Adams, Geol. Sur. Can., Memoir No. 6.

"Corundum, Its Occurrence, Distribution, Exploitation and Uses." Barlow, Geol. Sur. Can., Memoir No. 57.

A table showing the production of grindstones by provinces since 1886 follows:—

Annual Production of Grindstones.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		TOTAL.		Average value per ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	
1886.....	1,765	\$24,050	2,255	\$22,495	4,020	\$46,545	\$11.58
1887.....	1,710	25,020	3,582	38,988	5,292	64,008	12.10
1888.....	1,971	20,400	3,793	30,729	5,764	51,129	8.87
1889.....	712	7,128	2,692	23,735	3,404	30,863	9.07
1890.....	850	8,536	4,034	33,804	4,884	42,340	8.67
1891.....	1,980	19,800	2,499	22,787	4,479	42,587	9.51
1892.....	2,462	27,610	2,821	23,577	5,283	51,187	9.69
1893.....	2,112	21,000	2,488	17,379	4,600	38,379	8.34
1894.....	2,128	16,000	1,629	16,717	3,757	32,717	8.71
1895.....	1,400	14,000	2,075	17,932	3,475	31,932	9.19
1896.....	1,450	14,500	2,263	18,810	3,713	33,310	8.97
1897.....	1,407	17,500	3,165	24,840	4,572	42,340	9.26
1898.....	1,422	12,350	3,513	32,425	4,935	44,775	9.07
1899.....	1,378	10,300	3,133	32,965	4,511	43,265	9.59
1900.....	1,411	12,600	4,128	40,850	5,539	53,450	9.65
1901.....	358	3,200	4,223	42,490	4,581	45,690	9.97
1902.....	1,074	8,118	3,559	36,000	4,633	44,118	9.52
1903.....	1,337	9,562	4,201	38,740	5,538	48,302	8.72
1904.....	1,029	7,332	3,620	35,450	4,649	42,782	9.20
1905.....	1,020	10,200	4,520	52,175	5,540	62,375	11.25
1906.....	1,023	9,680	4,340	50,134	5,363	59,814	11.15
1907.....	551	4,480	4,863	55,896	5,414	60,376	11.15
1908.....	473	4,803	3,370	43,325	3,843	48,128	12.52
1909.....	312	3,204	3,963	51,460	4,275	54,664	12.79
1910.....	387	3,496	3,586	43,700	3,973	47,196	11.88
1911.....	380	3,382	4,186	49,560	4,566	52,942	11.59
1912.....	374	3,760	4,038	48,330	4,412	52,090	11.81
1913.....	350	4,900	4,487	46,425	4,837	51,325	10.61
1914.....	350	5,270	3,626	49,234	3,976	54,504	13.71
1915.....	285	5,300	2,295	30,468	2,580	35,768	13.86

The value of exports of grindstones finished and in the rough during the calendar year 1915, according to the records of the Department of Customs, was \$36,234 (finished, valued at \$35,334, and rough, at \$900), as compared with an export in 1914, valued at \$24,407 (finished, valued at \$24,113, and rough, \$294).

The greater proportion of the Canadian production of grindstones is exported. To meet Canadian requirements in Ontario and Quebec chiefly, there were imported during 1915: grindstones to the value of \$79,391, and other abrasives as follows: burrstones, 177, valued at \$314; emery \$67,067; manufactures of emery \$139,665; pumice stone \$18,814; sandpaper \$133,677; iron sand for glass or granite polishing or for sawing stone \$3,263; or a total value, including grindstones, of \$442,191. The imports in 1914 included: grindstones to the value of \$98,872; burrstones to the value of \$16; emery \$29,127; manufactures of emery \$88,881; pumice stone \$16,976, sandpaper \$138,415; iron sand for glass or granite polishing, or for sawing stone \$13,743; or a total value, including grindstones, of \$386,030.

Tables showing values of exports of grindstones and imports of abrasive materials into Canada follow:—

Exports of Grindstones.*

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1884.....	\$28,186	1895.....	\$16,723	1906.....	\$31,978
1885.....	22,606	1896.....	19,139	1907.....	32,534
1886.....	24,185	1897.....	18,807	1908.....	19,721
1887.....	28,769	1898.....	25,588	1909.....	13,942
1888.....	28,176	1899.....	23,288	1910.....	23,502
1889.....	29,982	1900.....	42,128	1911.....	29,206
1890.....	18,564	1901.....	29,130	1912.....	26,535
1891.....	28,433	1902.....	24,489	1913.....	54,867
1892.....	23,567	1903.....	27,659	1914.....	24,407
1893.....	21,672	1904.....	35,612	1915.....	36,234
1894.....	12,579	1905.....	24,868		

* Including stone for the manufacture of grindstones.

Imports of Abrasive Materials.

Fiscal Year.	Grindstones. Value.	Burrstones (c) Value.	Emery. (a) Value.	Mfs. of emery. (b) Value.	Pumice stone. (d) Value.	Iron Sand. (e) Value.	Sandpaper. (f) Value.
1880.....	\$11,714	\$12,049					
1881.....	16,895	6,337					
1882.....	30,654	15,143					
1883.....	31,456	13,242					
1884.....	30,471	5,365					
1885.....	16,065	4,517	\$ 5,066	\$ 4,920	\$ 9,384		
1886.....	12,803	4,062	11,877	5,832	2,777		
1887.....	14,815	3,545	12,023	4,598	3,594		
1888.....	18,263	4,753	15,674	4,001	2,890		
1889.....	25,564	5,465	13,565	3,948	3,232		
1890.....	20,569	2,506	16,922	5,313	3,003		
1891.....	16,991	2,089	16,179	6,665	3,696		
1892.....	19,761	1,464	17,782	6,492	3,282		
1893.....	20,987	3,552	17,762	5,606	3,798		
1894.....	24,426	3,029	14,433	2,223	4,160		
1895.....	22,834	2,172	14,569	7,775	3,609		
1896.....	26,561	2,049	16,287	11,913	3,721		
1897.....	25,547	1,827	16,318	11,231	2,903		
1898.....	22,217	1,813	17,661	15,478	3,829		
1899.....	27,476	1,759	21,454	22,343	5,973		
1900.....	34,382	1,546	19,312	25,615	5,604		
1901.....	39,068	5,762	16,311	22,190	5,516		
1902.....	40,838	2,559	14,476	23,892	7,254		
1903.....	53,388	586	18,058	22,177	6,152		
1904.....	46,039	35	21,626	29,273	6,557		
1905.....	49,747	2,607	21,980	33,250	8,447		
1906.....	59,627	2,661	21,781	42,080	9,053		
1907 (9 mos.).....	40,780	245	20,498	41,086	5,745		
1908.....	65,125	3,396	26,159	57,760	8,917		
1909.....	56,692	1,141	25,931	47,700	8,117		
Calendar Year.							
1910.....	71,394	854	40,400	92,890	14,829	\$ 6,647	\$148,384
1911.....	123,356	1,642	46,274	104,170	18,779	8,340	164,474
1912.....	112,020	1,409	46,616	130,571	21,310	13,347	189,782
1913.....	145,247	1,784	48,995	135,654	17,861	10,168	171,516
1914.....	98,872	16	29,127	88,881	16,976	13,743	138,415
1915.....	79,391	314	67,067	139,665	18,814	3,263	133,677

(a) Emery in bulk, crushed or ground. Duty free.

(b) Emery and carborundum wheels and manufactures of emery or carborundum.

(c) Burrstones in blocks, rough or unmanufactured, not bound up or prepared by binding into millstones.

(d) Pumice and pumice stone, ground or unground. Duty free.

(e) Iron sand or globules for polishing glass or granite, or for sawing stone. Duty free.

(f) Sandpaper, glass, flint, and emery paper or emery cloth.

The following is a list of the operators of grindstone quarries:—

The Mic Mac Grindstone Co., Ltd., New Glasgow, N.S.

Jos. W. Sutherland, West Merigomish, N.S.

The Read Stone Company, Stonehaven, N.B., and Sackville, N.B.

J. L. C. Knowles, Clifton, N.B.

The Miramichi Quarry Co., Ltd., Quarryville, N.B.

Tripolite.

The shipments of tripolite in 1915 were reported as 317 tons, valued at \$12,119.

A brief review of the uses of tripolite, together with a list of the principal known Canadian occurrences, was published in the Annual Report on Mineral Production for 1914.

The shipments from year to year have varied very much, and in some seasons the producing companies shipped from stock only.

From 1902 to the present, Nova Scotia has been the only province producing tripolite, and three companies only have appeared on the list of shippers. These are the Premier Tripolite Company with deposits (unworked for several years) at St. Anns in Victoria county, Cape Breton Island. The Fossil Flour Company, formerly operating at Bass River lake, Colchester county, near Castlereagh; and the Oxford Tripoli Company operating at Silica lake (formerly Bass River lake), Colchester county, the latter Company having taken over the property of the Fossil Flour Company.

At the plant of the Oxford Tripoli Company, the crude product is dried and treated on the spot in a 10-ton mill, after which it is exported to the United States.

The following table gives statistics of the Canadian production from 1896 to date, all of which has been exported.

Annual Shipments of Tripolite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1896.....	644	\$ 9,960	1906.....	Nil.	Nil.
1897.....	15	150	1907.....	30	\$ 225
1898.....	1,017	16,660	1908.....	30	195
1899.....	1,000	15,000	1909.....	Nil.	Nil.
1900.....	336	1,950	1910.....	22	134
1901.....	850	15,300	1911.....	20	122
1902.....	1,052	16,470	1912.....	38	230
1903.....	835	16,700	1913.....	620	12,138
1904.....	320	6,400	1914.....	650	13,000
1905.....	300	3,600	1915.....	317	12,119

A record of analyses of tripolite or diatomaceous earth from Canadian deposits follows, together with a table of analyses of samples from various other localities quoted for purposes of comparison.

Tripolite: Analyses of Canadian Samples.

Locality.	1	2	3	4	5	6
Sample from.	H. S. deSchmid.	H. S. deSchmid.	R. W. Ellis.	H. S. deSchmid.	E. A. D. Morgan.	C. H. Clapp.
Silica.....	72.10	81.30	80.487	74.98	79.20	75.92
Alumina.....	—	—	3.146	3.81	3.98	8.23
Ferric oxide.....	—	—	.951	.72	.57	3.43
Ferrous oxide.....	.51	.38	—	.64	.51	—
Lime.....	—	—	.342	.54	.68	1.85
Magnesia.....	—	—	.283	.36	.33	1.28
Soda.....	—	—	—	.65	.94	1.39
Potash.....	—	—	—	.25	.39	.94
Water—below 110 C...	6.10	5.16	13.321	5.74	8.26	5.40
Water—above 110 C...	10.70	9.34		9.56	3.84	
Organic matter.....	6.30	.82	—	2.72	1.80	—
Carbon dioxide.....	Nil.	Nil.	.011	Nil.	Nil.	1.08
Total.....	—	—	—	99.97	100.50	99.52

Analyses by Laboratory of Mines Branch, Ottawa.

Key to Localities:—

1. St. Anns, Victoria co., N.S. Operator, Premier Tripolite Co., 159 Maiden Lane, New York.
2. Silica Lake, Colchester co., N.S. Operator, Oxford Tripoli Co., Oxford, N.S.
3. Pollet River lake, Mechanic's Settlement, Kings co., N.B.
4. Fitzgerald lake, St. John co., N.B.
5. Chertsey tp., Range V, Lot 15, Montcalm co., Que.
6. Prospect lake, Lake District, near Victoria, B.C.

Tripolite: Analyses of Representative Samples.

Locality.	Hanover.	Germany.	Scotland.	Auvergne, France.	Maryland, U.S.A.	Virginia, U.S.A.
Silica.....	86.4	68.01	92.0	87.2	81.53	75.85
Alumina.....	1.6	7.13	—	2.0	3.43	9.88
Ferric oxide.....	1.5	6.82	2.5	—	3.33	2.92
Lime.....	1.3	—	—	—	2.61	.29
Magnesia.....	—	—	—	—	5.63	1.63†
Water.....	6.9	8.45	—	10.0	3.47	8.37
Other volatile and organic matter.....	2.3	8.17	5.5	—	—	—
Total.....	100.0	98.58	100.0	99.2	100.0	98.95

† Including potash and soda.

The following is a list of producers of tripolite in Canada in recent years:—

Producers of Tripolite.

Operator.	Address.	Location of Property.	Mine Office.	Manager or Representative.
Oxford Tripoli Company	Oxford, N.S.....	Silica Lake (formerly Bass R. Lake), Col- chester co.	Silica L., N.S.	A. M. Hinckley, Mine Mgr.
Premier Tripolite Company	159 Maiden Lane, New York, N.Y.	Munro Pt. St. Anns, Victoria co., Cape Breton Id., N.S.	St. Anns, Vic- toria co., N.S.	A. Fraser., Supt.

ACTINOLITE.

The production of actinolite in 1915 was reported as 220 tons, valued at \$2,420, after having been milled and prepared for the market.

Production of actinolite in Canada has been confined to Elzevir and Kaladar townships in Hastings and Addington counties, Province of Ontario, the centre for the industry being the village of Actinolite. The earliest operations date back to about 1883. Deposits have been worked only at intervals long apart when sufficient rock was broken to meet the demand for several subsequent years. As a rule there is ground each year just sufficient rock to meet the market requirements of the year. The only statistics of production prior to 1909 now available are for the years 1901, 1902, and 1903, when the output was valued at \$3,126, \$6,150, and \$1,650 respectively.

Actinolite is used as an ingredient for a coal-tar roofing compound, the grinding of the crude material being done in such a way as not to destroy the fibre.

An interesting review of the industry appeared in the Ontario Bureau of Mines Report, Vol. XXII, Part II, p. 117, and was quoted in the report on the Mineral Production of Canada for 1913.

The only shipper in recent years is the Actinolite Mining Company at Bloomfield, New Jersey, U.S.A., which owns deposits of actinolite in Kaladar and Elzevir townships, and a mill for grinding the same at Actinolite, Ontario.

Statistics of production during recent years are given in the following table:—

Annual Production of Actinolite.

Calendar Year.	Tons.	Value.	Average Price.
1909.....	Nil.	Nil.	.....
1910.....	30	\$ 330	\$11.00
1911.....	67	736	11.00
1912.....	92	1,000	10.87
1913.....	66	720	10.91
1914.....	119	1,304	10.96
1915.....	220	2,420	11.00

ALUNITE AND PYROPHYLLITE.

The occurrence of alunite and pyrophyllite at Kyuquot, Vancouver Island, was described by Mr. Charles H. Clapp in the Summary Report of the Geological Survey for 1913, p. 109, and his report thereon quoted in the Annual Report on Mineral Production for 1914, p. 177.

The San Juan Mining and Manufacturing Company, which is interested in the development of these deposits reports the shipment of 300 tons during 1915.

Mr. Clapp states that: "These deposits of alunite and pyrophyllite, which are the only deposits of their kind known in Canada, were "staked" in 1908, and during the last few years the pyrophyllite rock has been quarried by the British Columbia Pottery Company as a "fireclay," and by the San Juan Mining and Manufacturing Company as a base of a powdered household cleanser."

ARSENIC.

The total production of white arsenic in 1915 was 2,396 tons, valued at \$147,830, as compared with 1,737 tons, in 1914, valued at \$104,015, and 1,692 tons in 1913, valued at \$101,463.

Canada's production of white arsenic up to 1903 was secured from a plant at Deloro, Ontario, which treated mispickel residues from which the gold content had been extracted by amalgamation, and bromo-cyanide treatment. Since 1903 though, even in spite of a bounty offered in 1907 by the Ontario Government on "white arsenic, otherwise known as arsenious oxide, produced from mispickel ores, and not from ores carrying smaltite niccolite, or cobaltite" the industry has been dormant.

In 1906 plants treating cobalt ores made provision for the recovery of white arsenic as a by-product, and since then white arsenic has been produced each year, the production for the last five years being fairly constant in quantity. On this white arsenic no bounty is payable.

The plants which have been producing white arsenic from cobalt ores are located at Deloro, Thorold, Orillia, Copper Cliff, and Welland, all in the Province of Ontario. In 1915 only three of these were operating, viz.: the Deloro plant of the Deloro Mining and Reduction Company, the Thorold plant of the Coniagas Reduction Company, and the Welland plant of the Metals Chemical Co., Ltd.

Arsenical ore concentrates were shipped for several years by a gold mining company in Nova Scotia, but the last of these was made in 1910.

The exports of white arsenic in 1915 according to the records of the Department of Customs were 4,636,400 pounds (2,318 tons), valued at \$174,190, as compared with 3,751,900 pounds (1,876 tons) in 1914, valued at \$132,567.

The imports of white arsenic, or arsenious oxide, in 1915 were 14,222 pounds, valued at \$657, as compared with 5,012 pounds in 1914, valued at \$249.

Imports of sulphide of arsenic in 1915 were 171,993 pounds, valued at \$5,415, as compared with imports in 1914 of 11,494 pounds, valued at \$756.

There was also imported during 1915, arseniate, bi-arseniate and stannate of soda to the amount of 9,090 pounds, valued at \$503, as compared with 14,389 pounds in 1914, valued at \$604.

Annual Production of Arsenic.

Calendar Year.	ARSENICAL ORE.		WHITE ARSENIC.	
	Tons.	Value.	Tons.	Value.
1885.....			440	\$ 17,600
1886.....			120	5,460
1887.....			30	1,200
1888.....			30	1,200
1889.....			Nil.	Nil.
1890.....			25	1,500
1891.....			20	1,000
1892-3.....			Nil.	Nil.
1894.....			7	420
1895-8.....			Nil.	Nil.
1899.....			57	4,872
1900.....			303	22,725
1901.....			695	41,676
1902.....			800	48,000
1903.....			257	15,420
1904-5.....				
1906.....			201	14,058
1907.....	656	\$11,094	330	36,209
1908.....	986	17,506	715½	41,060
1909.....	224	3,346	1,129	64,100
1910.....	547	5,716	1,502	75,328
1911.....			2,097	76,237
1912.....			2,045	89,262
1913.....			1,692	101,463
1914.....			1,737	104,015
1915.....			2,396	147,830

Exports of White Arsenic.

Calendar Year.	Pounds.	Value.	Calendar Year.	Pounds.	Value.
1902.....	547,698	\$16,192	1909.....	3,111,249	\$ 119,673
1903.....	395,573	10,583	1910.....	4,512,673	173,932
1904.....	146,000	6,900	1911.....	4,125,558	81,761
1905.....	108,000	5,400	1912.....	3,847,906	101,310
1906.....	271,063	5,981	1913.....	2,606,767	107,094
1907.....	613,504	10,850	1914.....	3,751,900	132,567
1908.....	1,913,732	43,493	1915.....	4,636,400	174,190

Annual Imports of Arsenic, 1880-1906.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880.....	18,197	\$ 576	1889...	69,269	\$ 2,434	1898.....	291,967	\$ 14,270
1881.....	31,417	1,070	1890...	138,509	4,474	1899.....	582,383	24,203
1882.....	138,920	3,962	1891...	115,248	4,027	1900.....	230,730	11,035
1883.....	51,953	1,812	1892...	302,958	9,365	1901.....	159,263	8,361
1884.....	19,337	773	1893...	447,079	12,907	1902.....	106,857	6,004
1885.....	49,080	1,566	1894...	292,505	10,018	1903.....	298,375	11,824
1886.....	30,181	961	1895...	1,115,697	31,932	1904.....	414,065	12,421
1887.....	32,436	1,116	1896...	664,854	27,523	1905.....	268,274	7,661
1888.....	27,510	1,016	1897...	152,275	8,378	1906 Duty free	446,975	19,169

Imports of Arsenious Oxide and Sulphide of Arsenic.

Calendar Year.	ARSENIUS OXIDE.*		ARSENIC, SULPHIDE OF.*		Total.
	Pounds.	Value.	Pounds.	Value.	
1907.....	622,888	\$ 42,245	64,014	\$ 4,249	\$46,494
1908.....	127,942	4,043	302,970	12,754	16,797
1909.....	23,857	1,285	309,141	12,371	13,656
1910.....	260,415	6,891	257,451	8,946	15,837
1911.....	7,338	158	330,170	6,665	6,823
1912.....	76,528	1,722	451,928	19,431	21,153
1913.....	18,788	1,061	455,394	17,759	18,820
1914.....	5,012	249	11,494	756	1,005
1915.....	14,222	657	171,993	5,415	6,072

* Duty free.

Imports of Arseniate, Bi-Arseniate, and Stannate of Soda.

Calendar Year.	Pounds.	Value.
1907.....	307,247	\$ 3,919
1908.....	7,617	468
1909.....	22,889	975
1910.....	26,174	549
1911.....	47,532	1,908
1912.....	41,977	1,595
1913.....	22,892	987
1914.....	14,389	604
1915.....	9,090	503

ASBESTOS.

Asbestos production in Canada has for many years been confined to the Eastern Townships district of the Province of Quebec—Black Lake, Thetford, Robertsonville, Danville, and East Broughton being the shipping points. Other occurrences are known; but these are not of economic interest at present.

The asbestos deposits, and the asbestos industry (up to 1910) have been described fully in a special report of the Mines Branch.¹

There is no uniform classification of the different grades of marketable, crude and milled asbestos in use by the producers. In the absence of such a classification an arbitrary one based on valuation has been adopted by the Statistical Division of the Mines Branch for the Annual Reports on Mineral Production. According to the present classification which has been in use since 1910 the various grades represent material valued as follows:—

Crude No. 1. Value \$200 per ton, and upwards.

Crude No. 2. Value under \$200 per ton.

Mill stock No. 1. Value \$30 and upwards per ton.

Mill stock No. 2. Value \$15—\$30 per ton.

Mill stock No. 3. Value under \$15 per ton.

"Asbestic," also mentioned in the tables of statistics, is a fine asbestos powder which now enters largely into the construction and inside finish of fireproof buildings: it is manufactured from the sand and tailings from the shaking screens of some of the asbestos mills.

In 1915 the output of asbestos was 106,559 tons, as compared with 107,669 tons in 1914, and 132,564 tons in 1913. The total sales (not including asbestic) in 1915 were 111,142 tons, valued at \$3,553,166, or an average of \$31.97 per ton, as compared with sales in 1914 of 96,542 tons, valued at \$2,892,266, or an average of \$29.96 per ton, and in 1913 of 136,951 tons, valued at \$3,830,909, or an average of \$27.97 per ton. Sales of asbestic in 1915 were 25,700 tons, valued at \$21,819, or an average of 85 cents per ton, and in 1914 sales were 21,031 tons, valued at \$17,540, or an average of 83 cents per ton.

Stocks of asbestos on hand Dec. 31, 1915, were reported as 24,346 tons, valued at \$656,832 or an average of \$26.98 per ton, as compared with stocks on Dec. 31, 1914, of 31,171 tons, valued at \$1,100,267, or an average of \$35.30 per ton, and with stocks on Dec. 31, 1913, of 20,787 tons, valued at \$939,720, or an average of \$45.21 per ton.

The average number of men employed in mines and mills during 1915, was 2,394, at a wage cost of \$1,091,076, as compared with 2,992 men in 1914, at a wage cost of \$1,283,977.

¹ Chrysotile Asbestos: Its Occurrence, Exploitation, Milling and Uses," by Fritz Cirkel. Mines Branch, Department of Mines, Ottawa, No. 69.

The total quantity of asbestos rock sent to mills during 1915 is reported as 1,795,472 tons, which, with a mill production of 102,572 tons, shows an average estimated recovery of 5.71 per cent. In 1914 the recovery was 6.03 per cent, and in 1913 it was 6.04 per cent.

Statistics showing the output, sales, and stocks on hand, Dec. 31st, by grades, for the past three years are shown in the following tables:—

Output, Sales, and Stocks of Asbestos in 1915.

	Output.	Sales.			Stock on hand, December 31.		
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
Crude, No. 1.....	2,305.6	2,736.5	\$ 754,174	\$ 275.60	590.0	\$ 176,533	\$ 299.21
" No. 2.....	1,681.6	2,633.5	322,123	122.32	316.6	43,181	136.40
Mill stock, No. 1.....	21,709	24,471	1,287,502	52.61	2,259	99,002	43.83
" No. 2.....	41,973	42,031	840,132	19.99	12,837	268,197	20.89
" No. 3.....	38,890	39,270	349,235	8.89	8,343	69,919	8.39
Total asbestos.....	106,559.2	111,142	3,553,166	31.97	24,345.6	656,832	26.98
Asbestic.....	.....	25,700	21,819	0.85	.....	.....	.....

Output, Sales, and Stocks of Asbestos in 1914.

	Output.	Sales.			Stock on hand, Dec. 31.		
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
Crude, No. 1.....	1,450.6	1,335.9	\$ 402,417	\$ 301.23	984.3	\$ 301,237	\$ 306.04
" No. 2.....	2,611	2,812	370,776	131.87	1,411	187,338	132.78
Mill stock, No. 1.....	16,144	19,388	932,893	48.12	4,616	229,361	49.69
" No. 2.....	58,362	47,851	963,973	20.15	15,114	305,809	20.23
" No. 3.....	29,101	25,155	222,207	8.83	9,046	76,522	8.46
Total asbestos.....	107,668.6	96,541.9	2,892,266	29.96	31,171.3	1,100,267	35.30
Asbestic.....	.....	21,031	17,540	0.83	.....	.....	.....

Output, Sales, and Stocks of Asbestos in 1913.

	Output.	Sales.			Stock on hand, December 31.		
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
Crude, No. 1.....	2,015.4	1,853.3	\$ 531,200	\$286.62	880.5	\$247,877	\$281.52
" No. 2.....	3,010	3,807	457,962	120.29	1,522	178,789	117.47
Mill Stock, No. 1.....	23,444	26,198	1,229,908	46.95	6,755	350,165	51.84
" No. 2.....	58,592	60,164	1,201,215	19.97	4,809	108,285	22.52
" No. 3.....	45,503	44,929	410,624	9.14	6,820	54,604	8.01
Total asbestos.....	132,564.4	136,951.3	3,830,909	27.97	20,786.5	939,720	45.21
Asbestic.....	.....	24,135	19,016	0.79	.....	.....	.....

Annual Shipments of Asbestos and Asbestic.

Calendar Year.	ASBESTOS.			ASBESTIC.		
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.
1880 (a).....	380	\$ 24,700	\$ 65.00			
1881 (a).....	540	35,100	65.00			
1882 (a).....	810	52,650	65.00			
1883 (a).....	955	68,750	71.99			
1884 (a).....	1,141	75,097	65.82			
1885 (a).....	2,440	142,441	58.38			
1886 (a).....	3,458	206,251	59.64			
1887.....	4,619	226,976	48.92			
1888.....	4,404	255,007	57.90			
1889.....	6,113	426,554	69.78			
1890.....	9,860	1,260,240	127.81			
1891.....	9,279	999,878	107.76			
1892.....	6,082	390,462	64.20			
1893.....	6,331	310,156	86.81			
1894.....	7,630	420,825	55.15			
1895.....	8,756	368,175	42.05			
1896.....	10,892	423,066	38.84	1,358	\$ 6,790	\$5.00
1897.....	13,202	399,528	29.99	17,240	45,840	2.66
1898.....	16,124	475,131	29.47	7,661	16,066	2.10
1899.....	17,790	468,635	26.34	7,746	17,214	2.22
1900.....	21,621	729,886	33.76	7,520	18,545	2.47
1901.....	32,892	1,248,645	37.96	7,325	11,114	1.52
1902.....	30,219	1,126,688	37.28	10,197	21,631	2.20
1903.....	31,129	915,888	29.42	10,548	13,869	1.31
1904.....	35,611	1,213,502	34.08	12,854	12,850	1.00
1905.....	50,669	1,486,359	29.33	17,594	16,900	0.96
1906.....	60,761	2,036,428	33.52	21,424	23,715	1.11
1907.....	62,130	2,484,767	39.99	28,296	20,275	0.72
1908.....	66,548	2,555,361	38.40	24,225	17,974	0.74
1909.....	63,349	2,284,587	36.06	23,951	17,188	0.72
1910.....	77,508	2,555,974	32.98	24,707	17,629	0.71
1911.....	101,393	2,922,062	28.82	26,021	21,046	0.81
1912.....	111,561	3,117,572	27.95	24,740	19,707	0.80
1913.....	136,951	3,830,909	27.97	24,135	19,016	0.79
1914.....	96,542	2,892,266	29.96	21,031	17,540	0.83
1915.....	111,142	3,553,166	31.97	25,700	21,819	0.85

(a) Exports.

The shipment of crude asbestos and mill stock since 1903 are separately shown in the next table. The 1915 shipments of crude were 5,370 tons, valued at \$1,076,297, or an average of \$200.43 per ton, while the total shipments of mill stock were 105,772 tons, valued at \$2,476,869, or an average of \$23.42 per ton, in each case an increase over the 1914 shipments and, with the exception of 1912 and 1913, the largest shipments recorded.

Annual Shipments of Crude and Mill Stock Asbestos, 1903-15.

Calendar Year.	CRUDE.			MILL STOCK.		
	Short tons.	Value.	Per ton.	Short tons.	Value.	Per ton.
1903.....	3,134	\$ 361,867	\$ 115.46	27,995	\$ 554,021	\$ 19.79
1904.....	4,410	534,874	121.28	31,201	678,628	21.75
1905.....	3,767	472,859	125.53	46,902	1,013,500	21.61
1906.....	3,841	635,345	165.41	56,920	1,401,083	24.61
1907.....	4,327	830,632	191.97	57,803	1,654,135	28.62
1908.....	3,345.5	669,232	200.04	63,202	1,886,129	29.84
1909.....	3,074.3	575,510	187.20	60,275	1,709,077	28.35
1910.....	3,740	664,508	177.66	73,768	1,891,466	25.64
1911.....	4,864.1	744,962	153.15	96,529	2,177,100	22.55
1912.....	5,662.9	890,351	157.23	105,898	2,227,221	21.03
1913.....	5,660.3	989,162	174.75	131,291	2,841,747	21.64
1914.....	4,147.9	773,193	186.42	92,394	2,119,073	22.94
1915.....	5,370	1,076,297	200.43	105,772	2,476,869	23.42

EXPORTS AND IMPORTS.

The exports of asbestos in 1915 are recorded as 84,584 tons, valued at \$2,734,695, as compared with exports in 1914 of 81,081 tons, valued at \$2,298,646. There were also exports of asbestic sand in 1915 amounting to 25,103 tons, valued at \$157,410 as compared with 18,991 tons, valued at \$108,548 in 1914, and 24,766 tons, valued at \$138,737 in 1913.

From 1903 to 1915 inclusive, the exports of asbestos from Canada have been over 85 per cent of the total shipments. The exports to Great Britain, United States, Germany, and to other countries during recent years are shown in the following table. Not all the asbestos consumed by each country mentioned is imported directly, a great deal of the European demands being supplied through United States firms, and a great deal of the German and Austrian demands through Belgium, Holland and Italy.

Exports of Canadian Asbestos by Countries, 1903-1915.

Calendar Year.	TO GREAT BRITAIN.		TO UNITED STATES.		TO GERMANY.		TO OTHER COUNTRIES.		TOTAL EXPORTS.		Value per ton.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	
1903..	2,743	\$ 40,120	24,252	\$ 714,781	1,429	\$ 25,150	3,356	\$110,982	31,780	\$ 891,033	\$28.04
1904..	6,602	210,175	25,957	762,300	2,463	94,141	2,250	94,271	37,272	1,160,887	31.15
1905..	9,731	305,056	29,696	811,080	2,969	100,061	4,635	169,918	47,031	1,386,115	29.47
1906..	9,435	318,313	39,767	1,058,513	3,654	82,117	6,998	230,314	59,854	1,689,257	28.22
1907..	5,432	200,909	44,861	1,312,582	225	8,195	6,235	147,613	56,753	1,669,299	29.41
1908..	5,221	288,290	50,503	1,314,337	341	9,470	5,145	230,666	61,210	1,842,763	30.11
1909..	5,227	204,978	45,675	1,243,795	693	17,706	5,376	263,378	56,971	1,729,857	30.36
1910..	6,700	280,452	57,939	1,505,477	440	15,925	6,406	306,778	71,485	2,108,632	29.50
1911..	7,511	192,993	62,551	1,732,541	361	20,494	4,697	121,231	75,120	2,067,259	27.52
1912..	9,387	208,464	69,222	1,871,770	1,155	43,898	8,244	225,221	88,008	2,349,353	26.69
1913..	7,220	211,861	78,157	2,120,314	840	36,491	17,595	479,381	103,812	2,848,047	27.43
1914..	11,197	382,482	58,302	1,555,339	2,749	94,967	8,833	265,858	81,081	2,298,646	28.35
1915..	21,930	744,006	56,656	1,722,144	.....	.....	5,998	268,545	84,584	2,734,695	32.33

Annual Exports of Asbestos, Calendar Years 1892-1915.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
1892.....	5,380	\$373,103	\$69.35	1904.....	37,272	\$1,160,887	\$ 31.14
1893.....	5,917	338,707	57.24	1905.....	47,031	1,386,115	29.47
1894.....	7,987	477,837	59.82	1906.....	59,854	1,689,257	28.22
1895.....	7,442	421,690	56.66	1907.....	56,753	1,669,299	29.41
1896.....	11,842	567,967	47.96	1908.....	61,210	1,842,763	30.11
1897.....	15,570	473,274	20.40	1909.....	56,971	1,729,857	30.36
1898.....	15,346	494,012	32.19	1910.....	71,485	2,108,632	29.50
1899.....	17,883	473,148	26.46	1911.....	75,120	2,067,259	27.52
1900.....	16,993	693,105	39.61	1912.....	88,008	2,349,353	26.69
1901.....	32,269	1,069,918	33.16	1913.....	103,812	2,848,047	27.43
1902.....	31,074	995,071	32.02	1914.....	81,081	2,298,646	28.35
1903.....	31,780	891,033	28.04	1915.....	84,584	2,734,695	32.33

Canada, though the leading country in the world in the production of asbestos, does not yet manufacture all the asbestos goods needed to supply the domestic market. Consequently, there is a considerable importation annually of asbestos goods under the Customs classification of "Asbestos in any form other than crude, and all manufactures thereof," the duty being 25 per cent. The 1915 imports were valued at \$168,894, those of 1914 at \$282,053, and those of 1913 at \$520,082.

Annual Imports of Asbestos 1885-1915.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1885.....	\$ 674	1895.....	\$26,094	1906.....	\$137,974
1886.....	6,831	1896.....	23,900	1907 (9 mos.).....	127,509
1887.....	7,836	1897.....	19,032	1908.....	190,980
1888.....	8,793	1898.....	26,389	1909.....	180,598
1889.....	9,943	1899.....	32,607	Calendar Year.	
1890.....	13,250	1900.....	43,455	1910.....	230,849
1891.....	13,298	1901.....	50,829	1911.....	319,815
1892.....	14,090	1902.....	52,464	1912.....	461,449
1893.....	19,181	1903.....	75,465	1913.....	520,082
1894.....	20,021	1904.....	83,827	1914.....	282,053
		1905.....	116,836	1915*.....	168,894

* Asbestos in any form other than crude, and all manufactures of. Duty 25 per cent.

The imports of asbestos into the United Kingdom are of interest, as indicating the market in that country, and the sources from which it is supplied. From 1907 to 1912 inclusive, the imports ranged between a low limit of 6,477 and a high limit of 8,620 tons. In 1913 there was a sudden increase to 12,995 tons, and in 1915 a further increase to 28,586 tons. Except in the years 1909, 1911, and 1912, direct imports from Canada comprised over 50 per cent of the total, and in 1915 they reached the proportion of 68.5 per cent of the total imports.

Statistics as to these imports, indicating the sources of supply, appear in the following table:—

Imports of Raw Asbestos into the United Kingdom.*

	1913.		1914.		1915.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
Russia.....	1,770	\$218,966	1,403	\$140,072	230	\$ 19,418
Germany.....	392	40,836	296	44,160	.....	.....
Portuguese East Africa.....	216	19,773	329	28,446	796	73,910
Italy.....	101	12,653	84	21,131	39	7,694
United States.....	1,239	27,599	1,800	80,704	3,701	174,699
Other foreign countries.....	174	11,992	172	13,067	453	7,485
Total foreign.....	3,892	331,819	4,084	327,580	5,219	283,206
Cape of Good Hope.....	635	41,148	932	91,868	3,039	375,420
Natal.....	5	453	80	9,169	358	40,578
Canada.....	8,443	359,943	11,326	448,449	19,592	1,020,306
Other British possessions.....	20	1,324	58	3,849	378	31,624
Total British possessions.....	9,103	402,868	12,396	553,335	23,367	1,467,928
Grand total.....	12,995	734,687	16,480	880,915	28,586	1,751,134

* British Trade Report.

Following is a list of the firms reporting production of asbestos during 1915:—

Operator and Head Office Address.	Name of Mine.	LOCATION.		Mine Office.
		Township	Range and Lot.	
Asbestos Corp. of Canada, Limited, 263 St. James St., Montreal.	Kings.....	Thetford..	V 26; VI 26	Thetford Mines.
	Beaver.....	Coleraine..	C 31, 32.....	Black Lake.
	British Canadian.	"	Black Lake..	Thetford Mines.
Bell Asbestos Mines, Thetford Mines, Que. ...	Bell.....	Thetford..	V N-E½ 27 ..	
	Union.....			
Black Lake Asbestos and Chrome Co., Ltd., 60 Victoria, Toronto	Imperial.....	Coleraine..	B 27, 28.....	Black Lake.
Jacobs Asbestos Mining Co. of Thetford, Ltd., 282 St. Catherine W., Montreal.	Southwark.....	Thetford..	VI 28.....	Thetford Mines.
Johnson's (Asbestos) Company, Thetford Mines.	Johnson.....	Thetford..	VI 27.....	Black Lake.
The Asbestos and Asbestic Co., Ltd., Asbestos.	Johnson.....	Coleraine..	B 27.....	Thetford Mines.
The B. and A. Asbestos Company, Robertsonville.	Jeffrey.....	Shipton..	III 8, 9, 10..	Asbestos.
	B. and A.....	Thetford..	V 9.....	Robertsonville.
The Martin-Bennett Asbestos Mines, Ltd., Thetford Mines.	Ward-Ross.....	Thetford..	V 27.....	Thetford Mines.

The Frontenac Asbestos Co. reported small sales from stocks.

BARYTES.

During recent years the only barytes deposit worked in Canada is one at Lake Ainslie, Inverness county, N.S., (Post Office, Scotsville), owned by Barytes, Limited, of Halifax, N.S. Another deposit which may become a producer, is located on Mining Claim R.S.C. 216, Langmuir township, near Porcupine, Ontario.

Shipments of ground barytes in 1915 are reported as 550 tons, valued at \$6,875, as compared with 612 tons, valued at \$6,169 in 1914. During the last five years practically all the Canadian production has found a domestic market. Statistics of annual production and exports of barytes follow:—

Annual Production of Barytes.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
1885.....	300	\$1,500	\$5.00	1900.....	1,337	\$ 7,605	\$5.69
1886.....	3,864	19,270	4.98	1901.....	653	3,842	5.89
1887.....	400	2,400	6.00	1902.....	1,096	3,957	3.61
1888.....	1,100	3,850	3.50	1903.....	1,163	3,931	3.38
1889.....				1904.....	1,382	3,702	2.68
1890.....	1,842	7,543	4.09	1905.....	3,360	7,500	2.23
1891.....				1906.....	4,000	12,000	3.00
1892.....	315	1,260	4.00	1907.....	1,344	3,000	2.23
1893.....				1908.....	4,312	19,021	4.41
1894.....	1,081	2,830	2.62	1909.....	179	1,120	6.26
1895.....				1910.....			
1896.....	145	715	4.93	1911.....	50	400	8.00
1897.....	571	3,060	5.36	1912.....	464	5,104	11.00
1898.....	1,125	5,533	4.92	1913.....	641	6,410	11.00
1899.....	720	4,402	6.11	1914.....	612	6,169	10.08
				1915.....	550	6,875	12.50

Exports of Barytes.

Calendar Year.	Cwt.	Value.	Calendar Year.	Cwt.	Value.
1901.....	208	\$ 3,820	1908.....	3,509	\$13,690
1902.....	406	368	1909.....		
1903.....	13,080	5,178	1910.....	5	150
1904.....	34,488	14,343	1911.....		
1905.....	1,350	6,750	1912.....	68	114
1906.....	550	2,750	1913.....	Nil.	
1907.....			1914.....	Nil.	
			1915.....	Nil.	

Imports of barytes have not been separately shown in the Customs Department classification since 1890, but certain barium compounds are specifically mentioned. Imports of barium peroxide for the manufacture of hydrogen peroxide for the last nine months of 1913 were 26 tons, valued at \$3,600; for 1914, 42 tons, valued at \$5,722, and for 1915, 18 tons, valued at \$5,250. Imports of blanc fixé (artificial sulphate of barium) and satin white again showed an increase, being 2,746 tons, valued at \$59,471, as compared with 1,854 tons, valued at \$39,849 in 1914.

Statistics of imports appear in the following tables:—

Imports of Barytes.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880.....	2,230	\$1,525	1886.....		\$ 62
1881.....	3,740	1,011	1887.....	379	676
1882.....	497	303	1888.....	236	214
1883.....		185	1889.....	1,332	987
1884.....		229	1890.....	1,322	978
1885.....	7	14			

Imports of Blanc Fixé and Satin White.

Calendar Year.	Tons.	Value.	Average.
1910.....	1,016	\$22,726	\$22.37
1911.....	1,315	29,796	22.66
1912.....	1,635	34,794	21.28
1913.....	1,698	38,043	22.40
1914.....	1,854	39,849	21.49
1915.....	2,746	59,471	21.66

CHROMITE.

The production of chromite has been confined to the vicinity of Black Lake and Coleraine, Megantic county, Quebec.

From 1910 to 1914 inclusive, no chromite was mined in Canada, and only a few small shipments were made from stock; but in 1915, according to returns received, shipments amounted to 12,341 tons, valued at \$179,543.

Statistics of production from 1886 are shown in the following table. Material classed as high grade includes both ore and concentrates ranging from 48 per cent upwards in Cr_2O_3 , while low grade, composed chiefly of crude ore, includes all running below 48 per cent in Cr_2O_3 .

Annual Production of Chromite in Canada, 1886-1915.

Calendar Year.	HIGH GRADE.			LOW GRADE.			TOTAL.		
	Short tons.	Value.	Average price.	Short tons.	Value.	Average price.	Short tons.	Value.	Average price.
1886.....							60	\$ 945	\$15.75
1887.....							38	570	15.00
1888 to.....							{ No output }		
1893.....									
1894.....									
1895.....					20,000		1,000	20,000	20.00
1896.....					41,300		3,177	41,300	13.00
1897.....					27,004		2,342	27,004	11.53
1898.....					32,474		2,637	32,474	12.31
1899.....					24,252		2,021	24,252	12.00
1900.....					21,842		2,010	21,842	10.86
1901.....					27,000		2,335	27,000	11.56
1902.....					16,744		1,274	16,744	13.14
1903.....					13,000		900	13,000	14.44
1904.....	2,842	\$44,280	\$15.58	667	\$6,849	\$20.17	3,509	51,129	14.57
1905.....	4,650	53,976	16.08	1,424	13,170	9.25	6,074	67,146	11.05
1906.....	4,975	57,484	11.55	8,575	93,301	10.88	8,575	93,301	10.88
1907.....	3,545	41,931	11.83	4,060	34,375	8.47	9,035	91,859	10.17
1908.....	3,472	45,300	13.05	3,651	30,970	8.48	7,196	72,901	10.13
1909.....	54	720	13.33	3,753	36,708	9.78	7,225	82,008	11.35
1910.....	25	430	17.20	2,416	25,884	10.71	2,470	26,604	10.77
1911.....	137	2,327	16.98	274	3,304	12.06	299	3,734	12.49
1912.....				20	260	13.00	157	2,587	16.48
1913.....									
1914.....									
1915.....				136	1,210	8.90	136	1,210	8.90
				12,341	179,543	14.55	12,341	179,543	14.55

Dr. Harvie, who is conducting a detailed geological examination of the region states in the Summary Report of the Geological Survey for 1915, p. 172, that:—

"From 1900 to 1908 chromite was actively mined, but the output then abruptly declined to zero as the competition of the recently developed Rhodesian deposits became stronger. However, the disturbance of trade by the war has shut off or at least greatly reduced exports from the latter as well as from foreign sources of supply and the American munitions manufacturers have been forced to look to the Canadian deposits for supplies.

Chromite being on the list of prohibited exports, shipments are only permitted by special licence. In the course of last summer a feverish activity developed, urged on by the needs of manufacturers in the United States for an immediate and abundant supply. The demand has latterly become so insistent that any kind of material that at all approaches a chrome ore, as ordinarily defined, finds a ready sale. All available sources are being searched for ore, old dumps re-sorted, prospects and mines reopened, and every little pocket of ore gophered out and sold. At present the rush is for immediate production, but it is to be hoped that the present stimulus will also lead to the reasonable working of many of the properties and the development of ore reserves for a more stable industry. The chromite industry has suffered before on account of no attention having been paid to the necessity of reserves."

The exports of chromite from Canada according to the records of the Customs Department, were, 7,290 tons valued at \$81,838, or an average of \$11.23 per ton. On the other hand the imports into the United States from Canada according to the published record of the Bureau of Foreign and Domestic Commerce of the United States, were: 10,087 long tons (11,297 short tons), valued at \$117,302.

A table of imports of Canadian chromite into the United States from 1904-1915, and a table showing the total United States imports of chromium in 1914 and 1915, with sources of the same follow:—

Imports of Chromite into the United States from Canada¹.

Twelve months ending June 30.	Short tons.	Value.	Twelve months ending June 30.	Short tons.	Value.
1904.....	2,790	\$ 36,322	1910.....	269	\$2,892
1905.....	6,489	70,934	1911.....	17	150
1906.....	9,951	107,580	1912.....	14½	258
1907.....	6,179	66,115	1913.....	Nil.	.....
1908.....	6,505	69,009	1914.....	597	9,283
1909.....	4,455	50,042	1915.....	399	4,202

¹ The Foreign Commerce and Navigation of the United States, Washington, long ton in original changed to short ton.

Chromic Iron Ore Imported into the United States during the Calendar Years 1914 and 1915.*

	1914.			1915.		
	Quantity (long tons).	Value.	Price per ton.	Quantity (long tons).	Value.	Price per ton.
Canada.....	533	\$ 9,283	\$ 17.42	10,087	\$117,302	\$ 11.63
England.....	58	717	12.36	2	250	125.00
Greece.....	8,155	73,058	8.96	4,305	52,376	12.17
British South Africa.....	.....	.....	.....	22,800	277,388	12.17
French Oceania.....	30,860	201,907	6.54	28,031	177,125	6.32
Portuguese Africa.....	23,200	282,257	12.17	11,230	155,620	13.86
Turkey in Asia.....	11,880	88,084	7.41	.....	.....	.....
Total.....	74,686	655,306	8.77	76,455	780,061	10.20

* As furnished by the Bureau of Foreign and Domestic Commerce, U.S. Dept. of Commerce, and published in "Mineral Resources of the United States, 1915," Part I, p. 2.

Small quantities of ferro-chrome have been imported into Canada, but there is no separate record of the quantities thereof. The imports of bichromate of soda in 1915 were 467,943 pounds, valued at \$34,692, as compared with 583,467 pounds, valued at \$27,998 in 1914. The imports of bichromate of potash in 1915 were 142,025 pounds, valued at \$17,413, as against imports in 1914 of 108,144 pounds, valued at \$8,122.

The principal producers of chromite were: Black Lake Asbestos and Chrome Co., Ltd., 60 Victoria St., Toronto; P. E. Beaudoin, Thetford Mines, Que.; Dominion Mines and Quarries, Ltd., Dominion Bank Bldg., Toronto; Jos. M. Johnson, Black Lake, Que.; W. J. Woolsey, Black Lake, Que.; and D. Wilson, Sherbrooke, Que..

COAL.

The term "production" in the text and tables of this report is used to represent the tonnage of coal actually sold, or used, by the producer, as distinguished from the term "output" which is applied to the total coal extracted from the mine, and which includes, in some cases, coal lost or unsaleable, or coal carried into stock on hand at the end of the year.

The production of coal during 1915 was 13,267,023 short tons (11,845,556 long tons) valued at \$32,111,182 or an average of \$2.42 per ton, as compared with a production in 1914 of 13,637,529 short tons (12,176,365 long tons) valued at \$33,471,801 or an average of \$2.45 per ton, and a production in 1913 of 15,012,178 short tons (13,403,730 long tons) valued at \$37,334,940 or an average of \$2.49 per ton. The falling off in 1915 from the previous year was 370,506 tons or 2.7 per cent while compared with 1913, the year of greatest production, the decrease was 1,745,155 tons, or about 11.6 per cent.

The average number of men employed during 1915 was 24,574 and total wages paid \$17,385,200, as compared with an average of 27,571 men employed during 1914 and \$19,060,011 paid in wages.

The values given are partially estimated or assumed since complete returns have not been received with respect to amounts realized from coal sales. In the case of Nova Scotia an average value of \$2.50 per long ton is placed upon the total production, while for British Columbia an average value of \$3.50 per long ton is used. The values placed upon the Alberta production are those furnished by the operating companies.

The total exports of domestic coal from Canada in 1915 were 1,766,543 tons valued at \$5,406,058, as compared with 1,423,126 tons valued at \$3,880,175 in 1914. There is also a small export of coal "not the produce of Canada."

The total imports of coal in 1915 were 12,465,902 tons valued at \$28,345,605, as compared with imports in 1914 of 14,721,057 tons valued at \$39,801,498.

The total consumption of coal in 1915 was 23,906,692 tons, as compared with 26,852,323 tons in 1914 and 31,582,545 tons in 1913.

Bituminous coal constitutes by far the largest proportion of the annual production. Lignite only is produced in Saskatchewan, and in Alberta it forms a large proportion of the Province's production. Of anthracite there is a small output, less than 200,000 tons annually, from one mine, at Bankhead, Alberta.

Statistics of the production of coal by provinces in 1915 and 1914, and comparisons of 1915 production with that of 1914, and of the production of 1914 with that of 1913, are given in the tables following:—

Production of Coal by Provinces, 1915.

Province.	Average No. of men employed.	Wages paid.	PRODUCTION OF COAL.			Per cent of total quantity.
			Short tons.	Value.	Average per ton.	
Nova Scotia.....	12,557	\$8,133,085	7,463,370	\$16,659,308	\$2.23	56.25
Alberta.....	6,349	4,840,213	3,360,818	8,283,079	2.46	25.33
British Columbia.....	4,957	3,974,622	2,065,613	6,455,041	3.12½	15.57
Saskatchewan.....	344	203,657	240,107	365,246	1.52	1.81
New Brunswick.....	332	201,373	127,391	309,612	2.43	0.96
Yukon Territory.....	35	32,250	9,724	38,896	4.00	0.08
	24,574	17,385,200	13,267,023	32,111,182	2.42	100.00

Production of Coal by Provinces, 1914.

Province.	Average No. of men employed.	Wages paid.	PRODUCTION OF COAL.			Per cent of total quantity.
			Short tons.	Value.	Average per ton.	
Nova Scotia.....	14,080	\$8,270,869	7,370,924	\$16,452,955	\$2.23	54.05
Alberta.....	7,334	5,912,718	3,683,015	9,350,392	2.54	27.01
British Columbia.....	5,541	4,503,283	2,239,799	6,999,374	3.12	16.42
Saskatchewan.....	336	200,578	232,299	374,245	1.61	1.70
New Brunswick.....	236	138,547	98,049	241,075	2.46	0.72
Yukon Territory.....	44	34,016	13,443	53,760	4.00	0.10
	27,571	19,060,011	13,637,529	33,471,801	2.45	100.00

Comparison of Production, 1913 with 1914, and 1914 with 1915.

Province.	(i) INCREASE OR (d) DECREASE.			
	Years 1913 and 1914.		Years 1914 and 1915.	
	Short tons.	Per cent.	Short tons.	Per cent.
Nova Scotia.....	(d) 609,149	7.63	(i) 92,446	1.25
British Columbia.....	(d) 474,621	17.48	(d) 174,186	7.78
Alberta.....	(d) 331,740	8.26	(d) 322,197	8.75
Saskatchewan.....	(i) 19,402	9.11	(i) 7,808	3.36
New Brunswick.....	(i) 27,738	39.45	(i) 29,342	29.92
Yukon Territory.....	(d) 6,279	31.94	(d) 3,719	27.66
Total for Canada.....	(d) 1,374,649	9.16	(d) 370,506	2.72

A small increase is shown in production in Nova Scotia and Saskatchewan. There was also an increase in New Brunswick which, although not of great importance from the point of view of tonnage, is nevertheless an advance of nearly 30 per cent. There was a decreased production in Alberta, British Columbia, and the Yukon.

The proportions of the total production contributed by the different provinces show no wide variations from the two preceding years. Nova Scotia with a production 92,446 tons greater than in 1914 (an increase of 1.25 per cent) led the list with 56.25 per cent of the total. Alberta, with a decrease of 322,197 tons from the 1914 production (equivalent to 8.75 per cent) continues as second largest producer with 25.33 per cent of the total. The British Columbia production, with a decrease of 174,186 tons or 7.78 per cent, contributed 15.57 per cent of the total. In 1910 this Province produced nearly 26 per cent and in 1900 over 31 per cent of the total Canadian output. Saskatchewan, with an increase in 1915 of 7,808 tons or 3.36 per cent, contributed only 1.81 per cent of the total, and New Brunswick and the Yukon each less than one per cent.

The relative importance of the different provinces as coal producers for a number of years past is shown in the next table, in which is set forth the proportional contribution of each province to the total tonnage of coal produced in Canada. The coal-fields on the Atlantic sea-board still continue to produce more than half the total, although from 1910 onwards the combined production of the western provinces has only been a little less than 50 per cent of the total.

Province.	1874.	1890.	1900.	1910.	1911.	1912.	1913.	1914.	1915.
	%	%	%	%	%	%	%	%	%
Nova Scotia.....	91	71	62.9	50.25	62.35	53.94	53.62	54.77	57.21
New Brunswick.....									
Saskatchewan*.....			0.7	1.40	1.83	1.55	1.42	1.70	1.81
Alberta*.....			5.4	22.42	13.34	22.33	26.75	27.01	25.33
British Columbia.....	8	25	31.0	25.80	22.45	22.12	18.08	16.42	15.57
Yukon Territory.....				0.13	0.03	0.06	0.13	0.10	0.08

*Alberta and Saskatchewan were established as provinces on September 1, 1905. For the purpose of comparison, the coal production during the years previous to that date has been separated according to the present boundaries of these Provinces.

The following tables show the production and distribution of coal mined, by provinces, during recent years. The sales for consumption in Canada during 1915 were 9,826,712 tons, a decrease of 532,678 tons from 1914. The sales for export to the United States were 1,330,718 tons, an increase of 149,182 tons over 1914; and the sales for export to other countries were 297,343 tons, an increase of 57,416 tons over 1914. The total sales of Canadian coal were 11,454,773 tons as against 11,780,853 tons in 1914. The quantity used by colliery operators in the manufacture of coke, in steel plants, and in brick plants, etc., was 701,975 tons, while 1,110,275 tons were used in the operation of collieries and by workmen. Stocks show a falling off during the year of 99,294 tons. The loss due to breakage, washing, unmarketable slack, so far as returns were furnished, which are far from complete in this respect, were 312,467 tons.

Production and Distribution of Coal Mined, by Provinces, 1915.

(IN SHORT TONS.)

	Nova Scotia.	New Brunswick.	Sas- katch- ewan.	Alberta.	Yukon.	British Columbia.	Total.
Sold in Canada.....	5,693,615	119,694	225,497	3,038,761	9,264	739,881	9,826,712
Sold for export to U.S....	596,171	3,343	145	25,050	230	705,779	1,330,718
Sold for export to other countries.....	271,675					25,668	297,343
Total sales.....	6,561,461	123,037	225,642	3,063,811	9,494	1,471,328	11,454,773
Used by producers in making coke, steel, brick, etc.....	257,312		960	38,878		404,825	701,975
Used by producers for colliery consumption and by workmen.....	644,597	4,354	13,505	258,129	230	189,460	1,110,275
Total used.....	901,909	4,354	14,465	297,007	230	594,285	1,812,250
Production*.....	7,463,370	127,391	240,107	3,360,818	9,724	2,065,613	13,267,023
Stock on hand Jan. 1....	138,795	1,081	27	82,453	4,623	43,520	270,499
“ “ Dec. 31....	96,468	501	10	35,865	1,000	37,361	171,205
Difference.....	- 42,327	- 580	- 17	- 46,588	- 3,623	- 6,159	- 99,294
Losses due to breakage or other causes.....	92,696	112	3,035	76,337	1,386	138,901	312,467
Total output.....	7,513,739	126,923	243,125	3,390,567	7,487	2,198,355	13,480,196

*Production is obtained by adding coal sold and coal used.

Production and Distribution of Coal Mined, by Provinces, 1914.

(IN SHORT TONS.)

	Nova Scotia.	New Brunswick.	Sas- katch- ewan.	Alberta.	Yukon.	British Col- umbia.	Total.
Sold in Canada.....	5,851,735	94,455	217,898	3,218,234	7,547	969,521	10,359,390
Sold for export to U.S....	399,533	1,185		105,699		675,119	1,181,536
Sold for export to other countries.....	239,927						239,927
Total sales.....	6,491,195	95,640	217,898	3,323,933	7,547	1,644,640	11,780,853
Used by producers in making coke, steel, brick, etc.....	145,915		3,050	44,249		398,117	591,331
Used by producers for colliery consumption and by workmen.....	733,814	2,409	11,351	314,833	5,896	197,042	1,265,345
Total used.....	879,729	2,409	14,401	359,082	5,896	595,159	1,856,676
Production*.....	7,370,924	98,049	232,299	3,683,015	13,443	2,239,799	13,637,529
Stock on hand Jan. 1....	231,840	405		68,741	4,623	19,666	325,275
Stock on hand Dec. 31....	138,774	1,596	6	53,545	4,645	43,586	242,152
Difference.....	- 93,066	+ 1,191	+ 6	- 15,196	+ 22	+ 23,920	- 83,123
Losses due to breakage or other causes.....	170,184		7,995	75,853		180,305	434,337
Total output.....	7,448,042	99,240	240,300	3,743,672	13,465	2,444,024	13,988,743

*Production is obtained by adding coal sold and coal used.

Distribution of Coal Mined During the Years 1910-11-12-13.

(IN SHORT TONS.)

	1910.	1911.	1912.	1913.
Sold in Canada.....	8,956,450	8,559,952	10,572,365	11,381,960
Sold for export to United States.....	1,847,943	1,068,572	1,537,585	1,255,401
" other countries.....	291,273	280,235	314,410	263,189
Total sales.....	11,095,666	9,908,759	12,424,360	12,900,550
Used by producers for the manufacture of coke.....	759,703	452,354	870,885	914,421
" colliery consumption, and workmen.....	1,053,783	962,275	1,217,584	1,197,207
Production.....	12,909,152	11,323,388	14,512,829	15,012,178
Stock on hand Jan. 1.....	200,019	265,046	314,742	385,456
" Dec. 31.....	263,666	307,755	282,069	500,477
Difference.....	+ 63,647	+ 42,709	- 32,673	+ 115,021
Loss due to washing, breakage, or other causes.....	243,716	182,567	167,291	405,679
Total output.....	13,216,515	11,548,664	14,647,447	15,532,878

Statistics of the annual production of coal in Canada from 1785 to date are given in the following table. The total production has been 239,969,180 tons. Of this amount Nova Scotia has produced 152,760,879 tons, or 63·6 per cent; British Columbia 52,878,270 tons, or 22 per cent; Alberta 30,839,717 tons or 12·8 per cent; Saskatchewan 2,542,826 tons or 1·06 per cent; New Brunswick 823,493 tons or 0·34 per cent; and Yukon Territory 123,993 tons or 0·05 per cent.

Annual Production of Coal Showing Increase or Decrease.

Year.	Short tons.	Value.	Average per ton.	Increase (i) or decrease (d).	
				Short tons.	Per cent.
1785 to 1873.....	*8,592,150	\$14,507,000	\$1.69		
1874.....	1,063,742	1,763,423	1.66		
1875.....	1,039,974	1,747,016	1.68	(d) 23,768	2.2
1876.....	994,762	1,729,546	1.74	(d) 45,212	4.3
1877.....	1,036,670	1,794,415	1.73	(i) 41,908	4.2
1878.....	1,089,744	1,941,285	1.78	(i) 53,074	5.1
1879.....	1,126,497	2,050,639	1.82	(i) 36,753	3.4
1880.....	1,482,714	2,657,194	1.79	(i) 356,217	31.6
1881.....	1,537,106	2,688,621	1.75	(i) 54,392	3.7
1882.....	1,848,148	3,248,446	1.76	(i) 311,042	0.2
1883.....	1,818,684	3,109,635	1.71	(d) 29,464	21.6
1884.....	1,984,959	3,593,831	1.81	(i) 166,275	9.1
1885.....	1,920,977	3,417,807	1.78	(d) 63,982	3.2
1886.....	2,116,653	3,739,840	1.77	(i) 195,676	10.2
1887.....	2,429,330	4,388,206	1.81	(i) 312,677	14.8
1888.....	2,602,552	4,674,140	1.80	(i) 173,222	7.1
1889.....	2,658,303	4,894,287	1.84	(i) 55,751	2.1
1890.....	3,084,682	5,676,247	1.84	(i) 426,379	16.0
1891.....	3,577,749	7,019,425	1.96	(i) 493,067	16.0
1892.....	3,287,745	6,363,757	1.94	(d) 290,004	8.1
1893.....	3,783,499	7,359,080	1.95	(i) 495,754	15.1
1894.....	3,847,070	7,429,468	1.93	(i) 63,571	1.7
1895.....	3,478,344	6,739,153	1.94	(d) 368,726	9.6
1896.....	3,745,716	7,226,462	1.93	(i) 267,372	7.7
1897.....	3,786,107	7,303,597	1.93	(i) 40,391	1.1
1898.....	4,173,108	8,224,288	1.97	(i) 387,001	10.2
1899.....	4,925,051	10,283,497	2.09	(i) 751,943	18.0
1900.....	5,777,319	13,742,178	2.38	(i) 852,268	17.3
1901.....	6,486,325	12,699,243	1.96	(i) 709,006	12.3
1902.....	7,466,681	15,210,877	2.04	(i) 780,356	15.1
1903.....	7,960,364	15,942,833	2.00	(i) 493,683	6.6
1904.....	8,254,595	16,592,231	2.01	(i) 294,231	3.7
1905.....	8,667,948	17,520,263	2.02	(i) 413,353	5.0
1906.....	9,762,601	19,732,019	2.02	(i) 1,094,653	12.6
1907.....	10,511,426	24,381,842	2.32	(i) 748,825	7.7
1908.....	10,886,311	25,194,573	2.31	(i) 374,885	3.5
1909.....	10,501,475	24,781,236	2.36	(d) 384,836	3.5
1910.....	12,909,152	30,909,779	2.39	(i) 2,407,677	22.93
1911.....	11,323,388	26,467,646	2.34	(d) 1,585,764	12.28
1912.....	14,512,829	36,019,044	2.48	(i) 3,189,441	28.04
1913.....	15,012,178	37,334,940	2.49	(i) 499,349	3.44
1914.....	13,637,529	33,471,801	2.45	(d) 1,374,649	9.16
1915.....	13,267,023	32,111,182	2.42	(d) 370,506	2.72

*The total production for the years 1785 to 1873 is made up as follows:—

Nova Scotia (1785 to 1873).....8,053,670 tons of 2,000 pounds.
 British Columbia (1836 to 1873)..... 538,480 " 2,000 "

Exports of Canadian Coal.

Statistics of the exports of coal, according to the records of the Department of Customs, are given in the following table. The exports of Canadian coal in 1915 were 1,766,543 tons valued at \$5,406,058, or an average of \$3.06 per ton, as compared with exports in 1914 of 1,423,126 tons, valued at \$3,880,175, or an average of \$2.73 per ton, and exports in 1913 of 1,562,020 tons valued at \$3,961,351, or an average of \$2.54 per ton. The 1915 exports, compared with those of 1914, show an increase of 24.13 per cent in tonnage, and 39.33 per cent in value. Besides Canadian coal exported there is also a small export of "coal not the produce of Canada."

Exports of Coal Produced During 1913-14-15.

Exported to	1913.			1914.			1915.		
	Short tons.	Per cent.	Value.	Short tons.	Per cent.	Value.	Short tons.	Per cent.	Value.
Great Britain.....	12,098	0·8	\$ 39,103	25,576	1·8	\$ 86,764	53,882	3·1	\$ 185,317
United States.....	1,250,769	80·1	2,978,067	1,088,983	76·5	2,742,425	1,328,803	75·2	3,945,149
Newfoundland.....	220,147	14·1	653,346	174,921	12·2	523,728	228,634	12·9	683,732
Other countries.....	79,006	5·0	290,835	133,646	9·5	527,258	155,224	8·8	591,860
Total.....	1,562,020	100·0	3,961,351	1,423,126	100·0	3,880,175	1,766,543	100·0	5,406,058

Annual Exports of Coal.

(IN SHORT TONS.)

Calendar Year.	Produce of Canada.	Not the produce of Canada.	Calendar Year.	Produce of Canada.	Not the produce of Canada.
1873.....	420,683	5,403	1894.....	1,103,694	89,786
1874.....	310,988	12,859	1895.....	1,011,235	96,836
1875.....	250,348	14,026	1896.....	1,106,661	116,774
1876.....	248,638	4,995	1897.....	986,130	101,848
1877.....	301,317	4,829	1898.....	1,150,029	99,189
1878.....	327,959	5,468	1899.....	1,293,169	101,004
1879.....	306,648	8,468	1900.....	1,787,777	62,776
1880.....	432,188	14,217	1901.....	1,573,661	53,894
1881.....	395,382	14,245	1902.....	2,090,268	23,453
1882.....	412,682	37,576	1903.....	1,954,629	27,138
1883.....	486,811	44,388	1904.....	1,557,412	27,308
1884.....	474,405	62,665	1905.....	1,635,287	86,792
1885.....	427,937	71,003	1906.....	1,835,041	44,758
1886.....	520,703	78,443	1907.....	1,894,074	101,778
1887.....	580,965	89,098	1908.....	1,729,833	102,071
1888.....	588,627	84,316	1909.....	1,588,099	161,098
1889.....	665,315	89,294	1910.....	2,377,049	159,859
1890.....	724,486	82,534	1911.....	1,500,639	133,943
1891.....	971,259	77,827	1912.....	2,127,133	46,706
1892.....	823,733	93,988	1913.....	1,562,020	69,566
1893.....	960,312	102,827	1914.....	1,423,126	83,137
			1915.....	1,766,543	59,690

These figures show an increase of 22 per cent in exports to the United States, which, however, with an importation from Canada of 1,328,803 tons, took 75·2 per cent of Canada's exports. Exports to Newfoundland showed an increase of 30·7 per cent. Those to Great Britain showed an increase of 110 per cent, the total for the year reaching 53,882 tons. Under exports to other countries of 155,224 tons is included 22,723 tons to Australia, as compared with 40,978 tons in 1914.

Imports of Coal.

The fact that the populous Provinces of Quebec and Ontario have no coal-fields and can secure most of their requirements more cheaply from the

coal-fields of Pennsylvania, Ohio, and Virginia, than from Canadian coal-fields accounts for Canadian imports exceeding 50 per cent of Canada's annual coal consumption. The 1915 imports were 12,465,902 tons valued at \$28,345,605, as compared with total imports in 1914 of 14,721,057 tons valued at \$39,801,498 and imports in 1913 of 18,201,953 tons, valued at \$47,949,119.

Imports of coal into Canada are subdivided into three classes as follows: anthracite, including anthracite dust; bituminous, round and run-of-mine; and bituminous slack such as will pass through a $\frac{3}{4}$ -inch screen.

The imports of anthracite represent, practically, Canada's consumption of coal of this variety, as less than 200,000 tons is produced yearly by Canada's one anthracite coal mine at Bankhead, Alberta. The 1915 imports were 4,072,192 tons valued at \$18,753,980, an average of \$4.61 per ton, which was less by 362,818 tons or 8.2 per cent than the 1914 imports which amounted to 4,435,010 tons valued at \$21,241,924 or an average of \$4.79 per ton.

The imports of bituminous coal of all classes were 8,393,710 tons valued at \$9,591,625, as against 10,286,047 tons valued at \$18,559,574 in 1914, a decrease of 1,892,337 tons or 18.6 per cent. These imports included: bituminous round and run-of-mine 6,106,794 tons valued at \$7,564,369, or an average of \$1.24 per ton, and bituminous slack 2,286,916 tons valued at \$2,027,256, or an average of \$0.89 per ton. Imports during 1914 included bituminous, round and run-of-mine 7,776,415 tons valued at \$14,954,321 or an average of \$1.92 per ton, and bituminous slack 2,509,632 tons valued at \$3,605,253 or an average of \$1.43 per ton.

Annual Imports of Coal.

Fiscal Year.	BITUMINOUS COAL.		ANTHRACITE COAL AND ANTHRACITE DUST.		BITUMINOUS COAL DUST.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
1880.....	457,049	\$ 1,220,761	516,729	\$ 1,509,960	3,565	\$ 8,877
1881.....	587,024	1,741,568	572,092	2,325,937	337	666
1882.....	636,374	1,992,081	638,273	2,666,356	471	900
1883.....	911,629	2,996,198	754,891	3,344,936	8,154	10,082
1884.....	1,118,615	3,613,470	868,000	3,831,283	12,782	14,600
1885.....	1,011,875	3,197,539	910,324	3,909,844	20,185	20,412
1886.....	930,949	2,591,554	995,425	4,028,050	36,230	36,996
1887.....	1,149,792	3,126,225	1,100,165	4,423,062	31,401	33,178
1888.....	1,231,234	3,451,661	†2,138,627	5,291,875	28,808	34,730
1889.....	1,248,540	3,255,171	1,291,705	5,199,481	39,980	47,139
1890.....	1,409,282	3,528,959	1,201,335	4,595,727	53,104	29,818
1891.....	1,598,855	4,060,896	1,399,067	5,224,452	60,127	36,130
1892.....	1,615,220	4,099,221	1,479,106	5,640,346	82,091	39,840
1893.....	1,603,154	3,967,764	1,500,550	6,355,285	109,585	44,474
1894.....	1,359,509	3,315,094	1,530,522	6,354,040	117,573	49,510
1895.....	1,444,928	3,321,387	1,404,342	5,350,627	181,318	52,221
1896.....	1,538,489	3,299,025	1,574,355	5,667,096	210,386	53,742
1897.....	1,543,476	3,254,217	1,457,295	5,695,168	225,562	59,609
1898.....	1,684,024	3,179,595	1,460,701	5,874,685	229,445	45,556
1899.....	2,171,358	3,691,946	1,745,460	6,490,509	276,547	44,717
1900.....	2,439,764	4,310,964	1,654,401	6,602,912	330,174	98,349
1901.....	2,516,392	4,956,025	1,933,283	7,923,950	414,432	275,559
1902.....	3,047,392	5,712,058	1,652,451	7,021,939	489,548	264,550
1903.....	3,511,412	7,776,717	1,456,713	7,028,664	550,883	420,317
1904.....	4,053,900	9,108,208	2,275,018	10,461,223	608,041	544,128
1905.....	4,176,274	8,002,896	2,604,137	12,093,371	650,261	343,456
1906.....	4,495,550	8,360,348	2,200,863	10,304,308	747,251	489,180
Calendar Year.	Bituminous round and run of the mine (a)	Anthracite coal and Anthracite dust (b).	Bituminous slack such as will pass through a 4" screen (c).			
1907.....	6,370,152	13,232,445	3,141,873	14,506,129	1,139,256	1,121,949
1908.....	6,025,574	12,516,748	3,160,110	14,478,536	1,111,811	1,355,677
1909.....	5,625,063	11,455,818	3,017,844	13,906,152	1,230,017	1,469,889
1910.....	5,966,466	11,919,341	3,266,235	14,735,062	1,365,281	1,795,598
1911.....	8,905,815	18,407,603	4,020,577	18,794,192	1,632,500	2,090,796
1912.....	8,491,840	16,846,727	4,184,017	20,080,388	1,919,953	2,550,922
1913.....	10,743,473	21,756,658	4,642,057	22,034,839	2,816,423	4,157,622
1914.....	7,776,415	14,954,321	4,435,010	21,241,924	2,509,632	3,605,253
1915.....	6,106,794	7,564,369	4,072,192	18,753,980	2,286,916	2,027,256

(a). Duty, 53 cents per ton. (b). Coal, anthracite, and anthracite coal dust; duty free. (c). Duty 14 cents per ton.

† In the anthracite column the imports show a very considerable increase in 1888 over 1887, an increase of over 94 per cent, the falling off again in 1889 being quite as remarkable. The average values per ton for the three years 1887, 1888, and 1889, were \$4.02, \$2.47 and \$4.03, respectively. Although a duty of 50 cents per ton on anthracite coal was removed May 13, 1887, it is hardly thought this would account for the changes indicated, and unless some error may possibly have crept into the Trade and Navigation report, no explanation is available.

Consumption of Coal.

The consumption of coal estimated on the basis of production, imports and exports, was in 1915, 23,906,692 tons, as compared with 26,852,323 tons in 1914 and 31,582,545 tons in 1913, showing a decrease of 7,675,853 tons or 24 per cent in two years.

Consumption of Coal, 1913-14-15.

(IN SHORT TONS.)

	1913.	1914.	1915.
Production.....	15,012,178	13,637,529	13,267,023
Exports of Canada.....	1,562,020	1,423,126	1,766,543
Home consumption of Canadian coal.....	13,450,158	12,214,403	11,500,480
Imports.....	18,201,953	14,721,057	12,465,902
Exports not produce of Canada.....	69,566	83,137	59,690
Canadian consumption of imported coal.....	18,132,387	14,637,920	12,406,212
Total consumption of coal in Canada.....	31,582,545	26,852,323	23,906,692

Annual Consumption of Coal.

(IN SHORT TONS.)

Calendar Year.	Canadian.		Imported.		Total.	Per capita.
	Short tons	%	Short tons	%		
1886.....	1,595,950	45.9	1,884,161	54.1	3,480,111	0.758
1887.....	1,848,365	45.7	2,192,260	54.3	4,040,625	0.871
1888.....	2,013,925	37.8	3,314,353	62.2	5,328,278	1.137
1889.....	1,992,988	44.4	2,490,931	55.6	4,483,919	0.946
1890.....	2,360,196	47.8	2,581,187	52.2	4,941,383	1.031
1891.....	2,606,490	46.7	2,980,222	53.3	5,586,712	1.153
1892.....	2,464,012	44.4	3,082,429	55.6	5,546,441	1.133
1893.....	2,823,187	47.6	3,110,462	52.4	5,933,649	1.198
1894.....	2,743,376	48.5	2,917,818	51.5	5,661,194	1.130
1895.....	2,467,109	45.7	2,933,752	54.3	5,400,861	1.066
1896.....	2,639,055	45.1	3,206,456	54.9	5,845,511	1.140
1897.....	2,799,977	47.3	3,124,485	52.7	5,924,462	1.143
1898.....	3,023,079	48.0	3,274,981	52.0	6,298,060	1.200
1899.....	3,631,882	47.0	4,092,361	53.0	7,724,243	1.454
1900.....	3,989,542	47.8	4,361,563	52.2	8,351,105	1.561
1901.....	4,912,664	50.5	4,810,213	49.5	9,722,877	1.810
1902.....	5,376,413	51.0	5,165,938	49.0	10,542,351	1.927
1903.....	6,005,735	52.2	5,491,870	47.8	11,507,605	2.055
1904.....	6,697,183	49.2	6,909,651	50.8	13,606,834	2.346
1905.....	7,032,661	48.9	7,343,880	51.1	14,376,541	2.362
1906.....	7,927,560	51.7	7,398,906	48.3	15,326,466	2.425
1907.....	8,617,352	45.0	10,549,503	55.0	19,166,855	2.947
1908.....	9,156,478	47.3	10,195,424	52.7	19,351,902	2.820
1909.....	8,913,376	47.9	9,711,826	52.1	18,625,202	2.682
1910.....	10,532,103	50.2	10,438,123	49.8	20,970,226	2.960
1911.....	9,822,749	40.5	14,424,949	59.5	24,247,698	3.384
1912.....	12,385,696	46.0	14,549,104	54.0	26,934,800	3.596
1913.....	13,450,158	42.6	18,132,387	57.4	31,582,545	4.071
1914.....	12,214,403	45.5	14,637,920	54.5	26,852,323	3.325
1915.....	11,500,480	48.1	12,406,212	51.9	23,906,692	.....

Nova Scotia.

The production of coal in Nova Scotia in 1915 was 7,463,370 tons, as compared with a production in 1914 of 7,370,924 tons, showing an increase of 92,446 tons or 1.25 per cent. This production, however, was exceeded in both 1912 and 1913 by several hundred thousand tons although it was greater than that of any other previous year.

The total sales of coal during 1915 were 6,561,461 tons, of which 5,693,615 tons were sold for consumption in Canada, 596,171 tons for export to the United States, and 271,675 tons for export to other countries. The total quantity used by producers and in connexion with the collieries was

901,909 tons, including 257,312 tons used by producers in making coke and for other commercial purposes, and 644,597 tons used in the operations of the collieries, or by workmen.

A considerable tonnage of coal reported as sold for consumption in Canada is also used in the manufacture of coke, the total coal charged to coke ovens in the Province during the year being 981,369 tons.

The Dominion Coal Company has for many years been the principal operator, the total production of this firm's collieries at Cape Breton and at Springhill being 5,151,404 tons or over 69 per cent of the Province's production. The Nova Scotia Steel and Coal Company produced 384,759 tons or 5·8 per cent of the total; the Acadia Coal Company 336,748 tons or 5·1 per cent; the Inverness Railway and Coal Company 203,669 tons or 3·1 per cent; the Maritime Coal Railway and Power Company 172,402 tons; and the Intercolonial Coal Mining Company 167,507 tons. Cape Breton maintained its position as the chief coal producing county with 78·8 per cent of the total coal raised, Cumberland county being second with 9·8 per cent. Pictou county is credited with 7·7 per cent, and Inverness county with 3·7 per cent of the total.

Coal Production by Companies, in Nova Scotia, 1915.

(IN SHORT TONS.)

	Total sales.	Used.		Production. ²	Stocks.		Losses. ³	Output.
		For coke. ¹	Colliery consumption.		Jan. 1.	Dec. 31.		
Inverness Ry. and Coal Co.	203,669	.....	31,183	241,527	2,604	3,495	32,631	275,049
Sydney Coal Co., Ltd.	6,496	.....	90	6,720	13	.....	.....	6,707
Dominion Coal Co., Ltd.	4,776,447	.....	317,923	5,151,404	89,971	58,092	42,531	5,162,056
Cape Breton Coal, Iron, and Ry. Co.	5,907	.....	373	6,319	10,421	6,892	.....	2,790
Nova Scotia Steel and Coal Co., Ltd.	384,759	253,422	31,931	685,156	10,892	6,643	10,446	685,353
The Colonial Coal Co., Ltd.	59,261	.....	4,097	63,996	382	150	.....	63,764
Acadia Coal Co., Ltd.	336,748	.....	33,512	380,388	1,537	3,041	.....	381,897
Intercolonial Coal Mining Co.	167,507	3,890	28,964	207,318	11,831	2,813	1,034	190,334
Maritime Coal Ry. and Power Co.	172,402	.....	10,275	186,056	.....	9,303	.....	195,359
Dominion Coal Co., Ltd. (Springhill) ..	378,821	.....	63,409	453,719	8,777	3,669	275	448,886
Munzie Coal Co., Ltd.	66,380	.....	9,061	77,535	2,367	8,370	5,779	89,317
J. L. Rector, Fundy Mine.	824	.....	.....	824	.....	.....	.....	824
Royal Coal Co., Ltd. (L. Betts) ..	2,240	.....	112	2,408	.....	.....	.....	2,408
	6,561,461	257,312	530,930	7,463,370	138,795	96,468	92,696	7,513,739

¹ Includes also coal used by producers for steel making and other purposes.

² Production is obtained by adding sales and coal used.

³ Complete records of losses are not furnished by all producers.

Coal Production by Companies, in Nova Scotia, 1914.

(IN SHORT TONS.)

	Total sales.	Used.			Production. ²	Stocks.		Losses. ³	Output.
		For coke. ¹	Colliery consumption.	Workmen.		Jan. 1.	Dec. 31.		
Inverness Ry. and Coal Co.	225,807	742	31,216	7,374	265,139	1,942	2,604	30,823	296,624
Sydney Coal Co., Ltd.	7,840	.....	280	.....	8,400	48	.....	.....	8,352
Dominion Coal Co., Ltd.	4,412,463	.....	314,939	61,642	4,789,044	206,289	89,971	129,518	4,802,244
Cape Breton Coal, Iron, and Ry. Co.	37,119	.....	8,548	655	46,322	2,174	9,914	.....	47,102
Nova Scotia Steel and Coal Co., Ltd.	615,041	139,625	58,543	24,302	837,511	15,120	10,802	9,128	842,411
The Colonial Coal Co., Ltd.	54,645	.....	4,914	707	60,266	486	1,382	9,335	60,497
Acadia Coal Co., Ltd.	382,879	.....	46,596	12,714	442,189	2,900	1,386	.....	441,735
Intercolonial Coal Mining Co.	182,636	5,548	31,597	8,613	228,194	785	11,852	380	239,631
Maritime Coal Ry. and Power Co.	126,377	.....	26,788	3,349	156,514	.....	2,859	.....	159,370
Dominion Coal Co., Ltd. (Springhill)	382,029	.....	67,030	12,645	461,004	.....	8,777	.....	467,507
Minudie Coal Co., Ltd.	61,965	.....	8,644	2,367	72,876	2,974	.....	.....	72,976
Atlantic Grindstone Coal and Ry. Co.	714	.....	45	58	817	22	.....	.....	795
Royal Coal Co., Ltd.	1,680	.....	112	36	1,848	.....	.....	.....	1,848
	6,491,195	145,915	599,052	134,762	7,370,924	231,840	138,774	170,184	7,448,042

¹ Includes also coal used by producers for steel making and other purposes.

² Production is obtained by adding sales and coal used.

³ Complete records of losses are not furnished by all producers.

Output, Sales, Colliery Consumption, and Production of Coal in Nova Scotia.

Calendar Year.	Tons of 2,240 pounds.				Tons of 2,000 pounds.				Price per ton of 2,240 lbs.	Value of production.
	Output.	Sold or used.	Colliery consumption.	Production.*	Output.	Sold or used.	Colliery consumption.	Production.*		
1872.....	880,950	785,914	110,341	896,255	986,664	880,224	123,582	1,003,806	\$1.75	\$1,568,446
1873.....	1,051,467	881,106	108,398	989,504	1,177,643	986,839	121,406	1,108,245	1.75	1,731,632
1874.....	872,720	749,127	119,582	868,709	977,446	839,932	133,932	972,954	1.75	1,520,240
1875.....	781,165	706,795	124,110	830,905	874,905	791,610	139,003	930,613	1.75	1,454,084
1876.....	709,646	634,207	113,788	747,995	794,804	710,312	127,443	837,755	1.75	1,308,991
1877.....	757,496	687,065	98,841	785,906	848,396	769,513	110,702	880,215	1.75	1,375,339
1878.....	770,603	693,511	88,627	782,138	863,075	776,732	99,262	875,994	1.75	1,368,741
1879.....	788,271	688,624	84,787	773,411	882,863	771,259	94,961	866,220	1.75	1,353,469
1880.....	1,032,710	954,659	96,831	1,051,490	1,156,635	1,069,218	108,451	1,177,669	1.75	1,840,108
1881.....	1,124,270	1,035,014	107,888	1,142,902	1,259,183	1,159,216	120,834	1,280,050	1.75	2,000,079
1882.....	1,365,811	1,250,179	111,381	1,361,560	1,529,708	1,400,200	124,747	1,524,947	1.75	2,382,730
1883.....	1,422,553	1,297,523	111,949	1,409,472	1,503,259	1,453,226	125,383	1,578,609	1.75	2,466,576
1884.....	1,389,295	1,261,650	116,769	1,378,419	1,556,011	1,413,048	130,781	1,543,829	1.75	2,412,233
1885.....	1,352,205	1,254,510	127,624	1,382,134	1,514,470	1,405,051	142,939	1,547,990	1.75	2,418,735
1886.....	1,502,611	1,373,666	142,421	1,516,087	1,682,924	1,538,506	159,512	1,698,018	1.75	2,653,152
1887.....	1,670,830	1,519,684	139,777	1,659,461	1,871,330	1,702,046	156,550	1,858,596	1.75	2,904,057
1888.....	1,776,128	1,576,692	157,443	1,734,135	1,989,263	1,765,895	176,336	1,942,231	1.75	3,034,735
1889.....	1,756,279	1,555,107	158,131	1,713,238	1,967,032	1,741,720	177,107	1,918,827	1.75	2,998,167
1890.....	1,984,001	1,786,111	161,240	1,947,351	2,222,081	2,000,444	180,589	2,181,033	1.75	3,407,864
1891.....	2,044,784	1,849,945	174,983	2,024,928	2,220,158	2,071,938	195,981	2,267,919	1.75	3,543,624
1892.....	1,942,780	1,752,934	175,092	1,928,026	2,175,913	1,963,286	196,103	2,159,389	1.75	3,374,046
1893.....	2,223,042	1,977,543	205,425	2,182,968	2,489,807	2,214,848	230,076	2,444,924	1.75	3,820,194
1894.....	2,250,631	2,060,920	196,206	2,257,126	2,520,707	2,308,231	219,751	2,527,982	1.75	3,949,970
1895.....	1,999,756	1,793,098	193,639	1,986,737	2,239,727	2,008,270	216,875	2,225,145	1.75	3,476,790
1896.....	2,292,675	2,046,828	192,975	2,239,808	2,537,706	2,202,447	216,132	2,508,579	1.75	3,919,355
1897.....	2,340,031	2,044,672	181,716	2,226,388	2,020,835	2,290,032	203,522	2,493,554	1.75	3,806,170
1898.....	2,262,656	2,121,126	187,428	2,286,554	2,584,175	2,375,661	187,519	2,563,180	1.75	4,004,970
1899.....	2,865,443	2,633,989	177,460	2,811,449	3,209,296	2,950,067	138,775	2,148,822	2.00	5,622,808
1900.....	3,298,033	2,998,737	236,563	3,235,300	3,694,646	3,358,585	264,051	3,623,536	2.50	8,088,250
1901.....	3,411,127	3,141,127	307,463	3,712,561	4,279,557	3,820,462	337,606	4,158,068	1.75	6,496,982
1902.....	4,229,120	3,411,127	379,198	4,608,318	5,292,538	4,736,614	424,702	5,161,316	2.00	9,216,636
1903.....	5,215,562	4,565,720	481,903	5,047,623	5,841,429	5,113,607	459,731	5,653,338	2.00	10,095,246
1904.....	5,131,985	4,551,740	144,904	4,996,644	5,747,823	5,097,949	498,292	5,596,241	2.00	9,993,288

Output, Sales, Colliery Consumption, and Production of Coal in Nova Scotia.

Calendar Year.	Tons of 2,240 pounds.				Tons of 2,000 pounds.				Price per ton of 2,240 lbs.	Value of production.
	Output.	Sold or used.	Colliery consumption.	Production.*	Output.	Sold or used.	Colliery consumption.	Production.*		
1905.....	5,197,877	4,613,818	427,774	5,041,592	5,821,622	5,167,476	479,107	5,646,583	\$2.00	\$10,083,184
1906.....	5,844,813	5,093,131	460,891	5,554,022	6,546,191	5,704,307	516,198	6,220,505	2.00	11,108,064
1907.....	5,775,503	5,236,077	437,256	5,673,333	6,468,563	5,864,406	489,727	6,354,133	2.25	12,764,999
1908.....	6,076,330	5,224,787	576,509	5,939,767	6,805,489	5,851,761	645,690	6,652,539	2.25	13,364,476
1909.....	5,106,135	4,524,029	522,479	5,046,508	5,718,871	5,066,912	585,177	5,652,089	2.25	11,354,643
1910.....	5,817,109	5,199,715	542,376	5,742,091	6,515,162	5,823,681	607,461	6,431,142	2.25	12,916,705
1911.....	6,362,099	5,676,857	577,089	6,253,946	7,125,551	6,358,080	646,340	7,004,420	2.25	14,071,379
1912.....	6,995,289	6,296,940	652,960	6,949,900	7,834,724	7,052,573	731,315	7,783,888	2.50	17,371,750
1913.....	7,263,485	6,479,469	645,596	7,125,065	8,135,104	7,257,006	723,067	7,980,073	2.50	17,812,663
1914.....	6,650,038	5,925,991	655,191	6,581,182	7,448,042	6,637,110	733,814	7,370,924	2.50	16,452,955
1915.....	6,708,695	6,088,190	575,533	6,663,723	7,513,739	6,818,773	644,597	7,463,370	2.50	16,659,308

*This production is obtained by adding sales and colliery consumption.

Coal Trade by Counties in Nova Scotia, Calendar Years Since 1906.

(IN SHORT TONS.)

Calendar Year.	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.*	Raised.	Sold.*	Raised.	Sold.*	Raised.	Sold.*	Raised.	Sold.*
1906.	659,734	566,308	769,496	657,310	4,804,407	4,221,293	312,554	259,396	6,546,191	5,704,307
1907.	534,047	445,288	840,533	729,043	4,098,447	4,346,180	395,836	343,895	6,468,563	5,864,406
1908.	662,157	530,648	849,802	678,025	4,840,653	4,266,346	452,877	375,742	6,805,489	5,851,761
1909.	494,919	403,371	743,860	599,743	4,081,833	3,723,135	398,759	340,663	5,718,871	5,066,912
1910.	350,363	288,706	714,846	588,678	5,051,859	4,571,347	414,153	374,950	6,515,162	5,823,681
1911.	538,296	436,125	833,956	691,852	5,405,359	4,917,902	347,944	312,201	7,125,551	6,358,080
1912.	716,914	595,138	765,678	641,890	6,038,279	5,530,765	312,836	284,780	7,834,724	7,052,573
1913.	675,544	553,845	817,177	694,659	6,038,279	5,709,995	329,108	298,507	8,135,104	7,257,006
1914.	702,496	572,765	681,356	571,063	6,767,566	5,266,733	296,624	276,549	7,448,042	6,637,110
1915.	736,794	620,667	581,226	508,145	5,920,670	5,486,292	275,049	203,669	7,513,739	6,818,773

*Sales include coal used for making coke and steel.

Output of Coal in Nova Scotia by Collieries.

(IN SHORT TONS.)

.....

	Fiscal Year ending September 30.		
Colliery.	1913.	1914.	1915.
<i>Cape Breton County.</i>			
Dominion Coal Company.....	5,285,968	5,097,589	4,840,133
Nova Scotia Steel and Coal Co.....	908,806	890,262	645,547
Cape Breton Coal, Iron and Railway Co.....	.....	42,269	20,280
Sydney Coal Company.....	6,089	5,825	6,020
Colonial Mining Co.....	64,632	63,587	64,073
<i>Cumberland County.</i>			
Cumberland Railway and Coal Co.....	438,964	448,824	455,630
Maritime Coal, Railway, and Power Co., Chignecto.....	183,558	160,376	179,740
Minudie Coal Co.....	.....	.....	.....
Atlantic Grindstone and Coal Co.....	70,926	69,582	91,903
Royal (Eastern) Coal Co., Lawson Mine.....	3,040	962	501
Provincial Mining Co.....	.....	.....	1,646
			2,264
<i>Pictou County.</i>			
Acadia Coal Co.....	570,501	511,269	363,416
Intercolonial Coal Co.....	217,512	247,441	212,596
<i>Inverness County.</i>			
Inverness Coal and Railway Co.....	318,387	308,134	261,250

Production and Sales of Coal by Companies, in Nova Scotia, Year Ending September 30, 1915.

(IN SHORT TONS.)

Name of company.	Output.	Sales.	Colliery consumption.	Supplied workmen.	On bank at close of year.	Difference on bank compared with 1914.	
						Increase.	Decrease.
Dominion Coal Co. Ltd.	4,840,133	4,445,076	276,531	58,605	76,668	.....	21,628
Nova Scotia Steel & Coal Co., Ltd.	645,547	622,616	36,897	23,093	4,751	.....	39,644
Cumberland Railway & Coal Co., Ltd.	455,636	386,664	59,760	12,111	3,088	.....	7,252
Acadia Coal Co. Ltd.	363,416	319,533	32,005	10,424	1,951	.....	1,186
Maritime Coal Railway & Power Co.	179,740	155,050	5,835	3,299	12,759	11,471	.....
Inverness Railway & Coal Co.	261,250	188,148	22,853	6,841	2,648	.....	401
Intercolonial Coal Co.	212,596	175,488	30,323	8,073	7,883	.....	2,038
Sidney Coal Co.	6,020	5,589	132	208	113	91	.....
Colonial Mining Co.	64,073	58,433	5,049	591	.....	.....	.....
Minudie Coal Co.	91,903	70,912	8,891	2,167	.....	.....	67
Lawson Mine	1,646	1,658	50	6	.....	.....	.....
Atlantic Grindstone Coal & Ry. Co.	501	447	25	29	.....	.....	.....
Cape Breton Coal, Iron & Railway Co.	20,280	16,978	2,662	334	6,892	305	.....
Provincial Mining Co.	2,264	2,264	.....	.....	.....	.....	.....
Total	7,144,999	6,448,856	481,013	125,781	116,753	11,867	72,216

Number and Class of Workmen employed in the Coal Mines of Nova Scotia, Year ended September 30, 1915.

COMPANY.	Average day's work a month.	AVERAGE DAILY FORCE.					Horses.
		Surface.	Under-ground labour.	Cutting coal.	Transportation commercial, repairs, construction.	Total workmen.	Total days.
Dominion Coal Co.	19	871	4,504	1,189	3,249	9,813	1,695,987
N.S. Steel and Coal Co.	18	325	1,483	454	148	2,410	568,120
Cumberland Ry. and Coal Co.	21	202	1,421	386	60	1,069	284,713
Acadia Coal Co.	25	185	304	215	66	770	239,300
Intercolonial Coal Co.	18	211	235	171	33	650	160,965
Maritime Coal, Ry. and Power Co.	18	73	222	119	35	449	109,843
Inverness Ry. and Coal Co.	18	92	230	212	127	661	158,651
Sydney Coal Co.	18	3	2	3	3	11	2,387
Minudie Coal Co.	15	75	65	136	14	290	66,215
Lawson, Grindstone and Coal Co.	12	1	2	1	.....	4	350
Atlantic Grindstone and Coal Co.	12	1	2	1	.....	4	373
Provincial Co.	14	2	3	2	.....	7	600
Colonial Coal Co.	21	24	32	67	5	128	24,480
C. B. Coal Iron and Ry. Co.	10	5	25	25	5	60	1,550
Totals.....	.....	2,070	7,530	2,981	3,745	16,326	3,313,534
							895

New Brunswick.

The production of coal in New Brunswick during 1915 is estimated as 127,391 tons, as against 98,049 tons in 1914, an increase of 29,342 tons, or nearly 30 per cent. This is the largest production of coal that has been recorded for this Province. Several of the smaller operators have neglected to furnish this Department with returns of their production but close estimates have been made based on statistics published by the Provincial Department of Lands and Mines, and other records. The total shipments by rail from New Brunswick collieries, as kindly furnished by the Deputy Minister of Lands and Mines, were 122,422 short tons.

The coal producing areas include the Grand Lake coal-field in Queens and Sunbury counties, and the Beersville area in Kent county. The Minto Coal Company, the chief operator, produced 86,592 tons; the Rothwell Coal Company 5,932 tons; the Northfield Coal Company 3,994 tons; and the Dean Coal Company 4,984 tons. Other operators include: G. H. King, Harvey Welton, A. J. McEvoy, Dr. M. F. Keith, and the Winterport Mining Company.

Annual Production of Coal in New Brunswick.

Calendar Year.	Short tons.	Value.	Average per ton.	Calendar Year.	Short tons.	Value.	Average per ton.
1887.....	10,040	\$ 23,607	\$2.35	1901.....	17,630	\$ 51,857	\$2.94
1888.....	5,730	11,050	1.93	1902.....	18,795	39,680	2.11
1889.....	5,673	11,733	2.07	1903.....	16,000	40,000	2.50
1890.....	7,110	13,850	1.95	1904.....	9,112	18,224	2.00
1891.....	5,422	11,030	2.03	1905.....	29,400	58,800	2.00
1902.....	6,768	9,375	1.39	1906.....	34,076	68,152	2.00
1893.....	6,200	9,837	1.59	1907.....	34,584	77,814	2.25
1894.....	6,469	10,264	1.59	1908.....	60,000	135,000	2.25
1895.....	9,500	14,250	1.50	1909.....	49,029	98,496	2.25
1896.....	7,500	11,250	1.50	1910.....	55,455	110,910	2.00
1897.....	6,000	9,000	1.50	1911.....	55,781	111,562	2.00
1898.....	6,160	9,240	1.50	1912.....	44,780	89,560	2.00
1899.....	10,528	15,792	1.50	1913.....	70,311	166,637	2.37
1900.....	10,000	15,000	1.50	1914.....	98,049	241,075	2.46
				1915.....	127,391	309,612	2.43

In the Grand Lake area the coal seam which varies in thickness from 20 to 32 inches, is found at a depth of from 30 to 60 feet below the surface. The following description of operations is quoted from the Annual Report of the Crown Lands Department of the Province of New Brunswick, page XVI.

“Minto Coal Company:—During the year this Company has made a number of borings on properties which they control, with a view to extending their operations and providing for new fields as the present ones become worked out. It must be remembered that the coal seam in this vicinity is, on the average, but thirty inches in thickness, and, although comparatively easy to mine, yet at the present rate of mining only thirteen working days

are required to work out an acre. The system pursued by this Company in its operations is about as follows:—

“A line of shafts about 800 feet apart were sunk on what was formerly known as the Michael Coakley property (Lease No. 140), parallel, and 125 feet north of the southern boundary. Another line of shafts 425 feet north of these was also run and a third line 425 feet farther north again was likewise started. When the stratum of coal was reached in the shafts at a distance of from 30 to 60 feet below the surface, main levels were run connecting these shafts. These main levels have a cross section of about $4\frac{1}{2}$ feet high by six feet wide, and from them at intervals of 30 feet are run the by-levels connecting the series of main levels. A 10 foot wall is left next to the main level in order to always maintain this level as a means of drainage. The mine is drained with a natural flow through these main levels to their opening on the channel cut by the creek. After leaving this 10 foot wall next to the main level, the miner, who usually works alone, opens the side level for a width of 15 feet, with a height of about $3\frac{1}{2}$ feet, the latter being sufficient for him to work sitting on a stool, and allows the upper surface of the coal seam to be cleared of rock before blasting. A low power dynamite is used, having been found sufficiently effective as an explosive without pulverizing the coal as a higher explosive would be apt to do. The by-level is continued until it is met by a similar one worked out in the opposite direction from the next parallel main level. These 15 feet side levels having been opened up, there is left a wall 15 feet thick between the levels, but this wall is also taken out by propping the roof and working back towards the main level.

“The coal is taken to the shaft on push cars or boxes, as they are called, moved by hand, containing about 800 pounds of coal. A miner will send out from 8 to 10 of these boxes per day, or, if he has a helper to look after the cars, 15 or 16 boxes. He is paid 35 cents a box for this, delivered at the foot of the shaft. Out of this amount he must pay for his explosive, about 25 cents a day, and he must either stow away or deliver without cost at the foot of the shaft the overlying waste rock. He is also required, if a married man, to pay \$1.00 a month physician's fees, or 75 cents per month if unmarried. The Company furnishes houses at a nominal or small rental, and gives the miner his fuel. As there is no fire damp in the mine, small, unprotected acetylene lamps are used by the miners. The large shafts also at 800 foot intervals provide excellent ventilation.

“The thickness of the stratum is very uniform at thirty inches, and the dip, usually quite uniform, is one inch per 100 feet, south-easterly. The shaft houses where the coal is hoisted are not of a permanent character, as they are moved to newer shafts after each area is worked out. The coal after being hoisted is run out and dumped on a five-eighth inch mesh screen, the slack dropping directly into a railway freight car and the screened coal passing on directly by a chute to another car. Here the coal is looked

over by the Company's inspector, who picks out any foreign rock. There are at present about 200 miners on the payroll, consisting of about sixty Italians, forty-three Belgians, twenty-five French-speaking Canadians, twenty-six Germans and Austrians, six Russians, and forty who are English-speaking. The Company provides a foreman for each shaft. This foreman controls all the men working the levels which lead to the shaft.

"Mr. Henderson, the mines manager for the Company, tells me that there is a demand at present for fifty per cent more coal than the Company is able to raise, and the only reason that the demand cannot be satisfied is the lack of labor.

"During the spring and early summer there was not a very large demand for coal, and at the same time a number of miners were recruited for overseas regiments. The demand for coal, however, has been increased very rapidly during the autumn and the beginning of the winter, so that not only the Minto Coal Company, but other coal companies in this region are finding it very difficult, with the labor they are at present able to obtain, to keep up with the demand. The Minto Coal Company have erected a new office at their mines, and there is a resident manager with an office staff of three men.

"The following is a chemical analysis of a sample taken from top to bottom of the Minto Coal Company's coal seam:—

	Percentage.
Moisture.....	0·19
Volatile Combustible Matter.....	37·56
Fixed Carbon.....	57·20
Ash.....	5·05
Volatile Matter.....	37·75
Coke.....	62·25
Sulphur.....	3·12
Total Combustible Matter.....	94·76
Heating Value (in terms of British Thermal Units).....	14·279

"The Rothwell Coal Company are operating in a similar way to the Minto Coal Company, but on a very much smaller scale. The thickness of the seam in which they are working is only about twenty inches. They employ about forty men and are at present only working one shaft, although there is another shaft in readiness as soon as they can provide more help. With this Company their men will raise from two to two and a half tons per day, and are paid \$1.10 per ton, less the cost of their explosives. Explosives, however, are not in general use in this mine, many of the men preferring to take the coal out with the pick.

"The King Mining Company are operating two shafts at the present time and employ about thirty-five men, many of whom are Belgians. The

others are Italian, French, English and Scotch. Miners here are earning from \$70.00 to \$100.00 per month.

"The Northfield Coal Company are working one shaft and employing about twenty men at the present time, most of whom are French Canadians and Belgians. Their seam of coal will run from thirty to thirty-two inches in thickness.

"All these companies are using steam for hoisting and small cars in the mines running on steel rails, but in all cases pushed by hand.

"Harvey Welton is operating a mine in the vicinity of the Minto Coal Company, and conditions here are very similar to those of the larger company. He is working the two shafts, and employs from twenty to thirty English speaking workmen. He hoists by horse-power, as does Mr. J. S. Gibbon of the Winterport Mining Company, and with these last two operators the coal is loaded in smaller boxes run on wooden rails to the shaft.

"In most of the mines at Minto there is natural drainage, the principle being to conduct the water through one of the main levels to its intersection with a creek bed.

"The Canadian Pacific and the Government Railways are the principal customers."

Saskatchewan.

The coal deposits of Saskatchewan furnish coal of the lignite variety only. As some of the physical characteristics of this lignite in its raw state tend to prevent its successful and economical use, the yearly production of recent years shows only a slight increase, in no way comparable with the increase in population of the Province, and the consequent increased demand for fuel for heating, and the generation of power. The importance of devising better methods for utilizing this lignite, of which vast quantities exist in the adjacent Province of Alberta, as well as in the Province of Saskatchewan, has prompted both the Government of the Province of Saskatchewan, and the Fuel Testing Division of the Mines Branch, Ottawa, to undertake investigations of western lignites, the first results of which have already been published.¹

The production of lignite in 1915 from 33 collieries was 240,107 tons valued at \$365,246, as compared with 232,299 tons valued at \$374,245 in 1914, an increase of 7,808 tons or 3 per cent. The 1915 production included 225,642 tons of coal sold and 14,465 tons used by producers for colliery consumption, by workmen, or in brick making.

The output of coal comes chiefly from the vicinity of Estevan, located on the Souris river, near the southeastern corner of the Province. Coal deposits exist for 75 or 100 miles in a northwest southeast direction along

¹ "The carbonizing and briquetting of Lignite," by S. M. Darling, 1915. Investigation for the Government of the Province of Saskatchewan.
Results of the Investigation of Six Lignite Samples obtained from the Province of Alberta, by Haanel and Blizard, 1915. Mines Branch publication No. 331.

the Souris river, on Big Muddy creek draining Willowbunch lake (only lately reached by a branch line of railway) and on the north branch of the Saskatchewan river about 100 miles southwest of Saskatoon.

The principal operators are, The Western Dominion Collieries, Ltd., Taylorton, with a production of 88,500; The Manitoba and Saskatchewan Coal Co. Ltd., Bienfait, 63,584 tons; The Bienfait Commercial Co., Ltd., Bienfait, 41,040 tons; and The Maple Leaf Mines, Ltd., Shand, 26,581 tons.

We are able through the courtesy of the operators to publish for the first time a record of the production from individual properties as shown in the following table:—

Production of Coal in Saskatchewan in 1915, by Principal Operators.

(IN SHORT TONS.)

Name of Company.	Days in operation.	Total sales.	Total for colliery use.*	Total production.
Western Dominion Collieries, Ltd., Taylorton.....	188	83,308	5,200	88,500
Manitoba and Saskatchewan Coal Co., Ltd., Bienfait.....	176	58,600	4,984	63,584
Bienfait Commercial Co., Ltd., Bienfait.....	202	39,385	1,655	41,040
Maple Leaf Mines, Ltd., Shand.....	239	24,286	2,295	26,581
Geo. Parkinson, Estevan.....	305	5,448	.....	5,448
McNell & Rooks, Estevan.....	300	3,000	200	3,200
Great West Brick and Coal Co., Estevan.....	150	2,000	.....	2,000
Eldness Bros., Gladmar.....	266	1,645	.....	1,645
H. Nicholson, Estevan.....	.....	1,317	.....	1,317
J. F. Bulmer, Roche Percee.....	69½	980	38	1,018
All other operators.....	.....	5,681	93	5,774
Total production, Saskatchewan.....	.....	225,642	14,465	240,107

*Includes consumption under boilers, etc., and coal used by workmen.

Annual Production of Coal in Saskatchewan.

Calendar Year.	Short tons.	Value.	Average per ton.	Calendar Year.	Short tons.	Value.	Average per ton.
1887.....	(a) 400	\$ 800	\$ 2.00	1902.....	70,400	\$ 112,640	\$ 1.52
1890.....	200	200	1.00	1903.....	116,703	169,618	1.45
1891.....	.....	.....	.....	1904.....	124,885	187,021	1.50
1892.....	5,400	9,325	1.73	1905.....	107,596	152,334	1.42
1893.....	8,325	12,485	1.50	1906.....	108,398	164,146	1.51
1894.....	(b) 15,051	15,153	1.01	1907.....	151,232	252,437	1.67
1895.....	15,769	31,538	2.00	1908.....	150,556	253,790	1.69
1896.....	16,706	25,059	1.50	1909.....	192,125	296,339	1.54
1897.....	25,000	37,500	1.50	1910.....	181,156	293,923	1.62
1898.....	25,000	37,500	1.50	1911.....	206,779	347,248	1.68
1899.....	25,000	37,500	1.50	1912.....	225,342	368,135	1.63
1900.....	40,500	60,750	1.50	1913.....	212,897	358,192	1.68
1901.....	45,000	72,000	1.60	1914.....	232,299	374,245	1.61
				1915.....	240,107	365,246	1.52

(a) From Turtle Mountain district, Manitoba.

(b) Including a small quantity from the Turtle Mountain district, Manitoba.

Alberta.

Lignite, bituminous, and anthracite coals are all produced in Alberta. Bituminous coal comprises over 50 per cent of the production, lignite between 40 and 45 per cent, and anthracite, less than 5 per cent.

As mentioned in the notes on the Saskatchewan production, the vast tonnage of lignites available in the western provinces has prompted investigations with a view to the better utilization of these lignites. The first results of the investigation of Alberta samples by the Fuel Testing Division of the Mines Branch, Ottawa, have been published as a special report.¹

The production of coal in Alberta in 1915 according to returns received from the operators was 3,360,818 tons valued at \$9,283,079 or an average of \$2.46 per ton, as compared with a production in 1914 of 3,683,015 tons valued at \$9,350,392 or an average of \$2.54 per ton, showing a decrease in 1915 of 322,197 tons, or 8.75 per cent.

The highest production in Alberta was reached in 1913 with a total of 4,014,755 tons, this Province having in 1912 become the second largest coal-producing province, which position is still maintained. There are many small operators in the Province—in fact so many new operators are producing coal each year that it is difficult to keep lists of them complete. The production of each of the larger collieries is shown in the following table. In 1915 there were 39 companies reporting a production in excess of 10,000 tons, the aggregate production by these firms being nearly 93 per cent of the total of the Province. Eight of these companies reported a production exceeding 100,000 tons each, the largest operator being the Canadian Pacific Railway with a total of 541,567 tons from Bankhead and Lethbridge.

Of the total production 3,063,811 tons were reported as sales, including 3,038,761 tons sold for consumption in Canada and 25,050 tons sold for export to the United States, 297,007 tons were used by the producers, including 38,878 tons in coke ovens and 258,129 tons used for colliery operation and by workmen.

¹Results of the Investigation of Six Lignite Samples obtained from the Province of Alberta, by Haanel and Blizard, 1915, Mines Branch publication No. 331.

Production of Coal in Alberta, in 1915, by Principal Collieries.

(IN SHORT TONS.)

Name of Company and mine address.	Days in operation.	Total sales.	Total for colliery use.*	Total production.
Alberta Coal Mining Co., Ltd., Cardiff.....	167	45,750	3,000	48,750
Battle River Collieries, Ltd., Rosenroll.....	152	9,776	1,540	11,316
Brazeau Collieries, Ltd., Nordegg.....	237	254,934	6,222	261,156
Brule Lake Coal Mine, Entrance.....	312	14,726	.....	14,726
Bush Mine Coal Co., Beverly.....	284	14,395	475	14,870
Byers Bros., Clover Bar.....	197	10,000	.....	10,000
Canada West Coal Co., Ltd., Taber.....	102	37,073	12,792	49,865
Canmore Coal Co., Ltd., Canmore.....	169	140,544	13,310	153,854
Canadian Pacific Ry. Bankhead.....	144	130,250	21,877	152,127
" " " Lethbridge, Galt No. 3.....	167	125,993	24,000	149,993
" " " " " 6.....	164	210,447	29,000	239,447
Cardiff Collieries, Ltd., Cardiff.....	162	91,932	6,645	98,577
Chinook Coal Co., Commerce.....	220	50,801	8,602	59,403
City of Lethbridge Coal Mine, Lethbridge.....	261	11,830	.....	11,830
Consumers Co-operative Co., Ltd., Big Valley.....	234	12,253	500	12,753
Dawson Coal Co., Edmonton.....	239	15,832	550	16,382
Dobell Coal Co., Ltd., Tofield.....	236	15,968	1,894	17,862
Drumheller Land Co., Ltd., Drumheller.....	129	13,317	1,025	14,342
Franco-Canadian Collieries, Ltd., Frank.....	227	67,849	12,918	80,767
Georgetown Collieries, Ltd., Canmore.....	228	42,021	2,727	44,748
Great West Coal Co., Edmonton.....	247	49,654	3,179	52,833
Hillcrest Collieries, Ltd., Hillcrest.....	202	214,021	10,730	224,751
Humberstone Coal Co., Beverly.....	288	41,868	2,885	44,753
International Coal and Coke Co., Ltd., Coleman.....	151	52,700	(c) 51,937	104,637
Jasper Park Collieries, Ltd., Pochahontas.....	210	67,394	4,377	71,771
McGillivray Creek Coal & Coke Co., Ltd., Coleman.....	194	148,681	5,090	153,771
Midland Collieries, Ltd., Drumheller.....	248	40,000	3,200	43,200
Mountain Park Coal Co., Ltd., Mountain Park.....	195	77,129	4,508	81,637
Newcastle Coal Co., Ltd., and Drumheller.....	280	62,206	1,050	63,256
Alberta Block Coal Co., Ltd.				
Pacific Pass } North American Collieries, Ltd.	189	69,208	4,636	73,844
Lethbridge } (formerly Canadian Coal and	185	138,021	11,108	149,129
St. Albert } Coke Co., Ltd.)	247	6,290	4,624	10,914
Pembina Coal Operators, Ltd., Evansburgh.....	160	28,869	3,665	32,534
Rock Springs Coal & Brick Co., Elcan.....	113	19,200	2,000	21,200
Round Hill Collieries, Ltd., Roundhill.....	241	23,840	189	24,029
Rosedale Coal & Clay Products Co., Rosedale.....	269	18,194	481	18,675
Rose Deer Coal Mining Co., Wayne.....	220	17,450	2,575	20,025
Star Coal Mines, Rosedale.....	216	26,098	750	26,848
Tofield Coal Co., Tofield.....	.....	26,440	1,350	27,790
Twin City Coal Co., Edmonton South.....	262	60,810	5,820	66,630
West Canadian Collieries, Ltd., Bellevue.....	179	291,050	10,964	302,014
" " " Blairmore.....	175	39,364	2,479	41,843
All other companies.....		2,834,178	284,674	3,118,852
		229,633	12,333	241,966
Total production, Alberta.....		3,063,811	297,007	3,360,818

*Includes consumption under boilers, etc., and coal used by workmen.

(a) 82,249 briquettes; (b) 1,007 briquettes; (c) 38,878 for manufacture of coke.

Production of Coal in Alberta, in 1914, by Principal Collieries.

(IN SHORT TONS).

Name of Company.	Days in operation.	Total sales.	Total colliery consumption*	Total production.
Alberta Coal Mg. Co., Cardiff.....	175	46,690	3,000	49,690
Battle River Collieries, Rosenroll.....	224	10,298	1,267	11,565
Brazeau Collieries, Ltd., Nordegg.....	290	153,011	2,311	155,322
Canada West Coal Co., Taber.....	87	45,744	15,064	60,808
Can. Coal & Coke Co., Ltd., Beaver Mines.....	112	28,055	5,323	33,378
" " " Lethbridge.....	151	98,381	13,065	111,446
" " " Pacific Pass.....	283	85,709	4,208	89,917
Canmore Coal Co., Ltd., Commerce.....	241	158,137	12,385	170,522
Can. Pacific Railway, Bankhead.....	237	(a) 151,513	(b) 34,657	186,170
" " " Lethbridge No. 1.....	184	135,965	32,057	168,022
" " " Lethbridge No. 2.....	189	230,071	39,104	269,175
Capital Coal Co., Cardiff.....	179	33,363	1,591	34,954
Cardiff Collieries, Ltd., Cardiff.....	176	126,000	5,025	131,025
Chinook Coal Co., Canmore.....	191	59,771	8,710	68,481
City of Lethbridge Coal Mine, Lethbridge.....	261	11,323	.....	11,323
Davenport Coal Co., Burmis.....	70	10,560	647	11,207
Dawson Coal Co., Edmonton.....	249	21,340	650	21,990
Dobell Coal Co., Tofield.....	269	18,479	1,874	20,353
Edmonton Standard Coal Co., Edmonton.....	293	12,869	1,606	14,475
Franco-Can. Collieries, Ltd., Frank.....	268	29,423	13,317	42,740
Georgetown Collieries, Ltd. (The), Canmore.....	266	35,318	3,581	38,899
Hillcrest Collieries, Ltd., Hillcrest.....	211	203,308	10,672	213,980
Humberstone Coal Co., Beverly.....	285	69,000	5,600	74,600
International Coal & Coke Co., Coleman.....	226	(c) 218,543	21,049	239,592
Jasper Park Collieries, Ltd., Pocahontas.....	279	74,213	4,014	78,227
Leitch Colliery, Ltd., Passburg.....	243	57,401	4,024	61,425
McGillivray Ck. Coal & Coke Co., Coleman.....	252	184,965	5,646	190,611
Midland Collieries, Ltd., Drumheller.....	165	15,000	1,750	16,750
Mountain Park Coal Co., Ltd., Bickerdike.....	273	79,210	3,783	82,993
Newcastle Coal Co., Drumheller.....	211	60,000	950	60,950
Pembina Coal Co., Ltd., Evansburgh.....	276	31,896	6,920	38,816
Redcliff Brick & Coal Co., Redcliff.....	191	10,662	.....	10,662
Rock Springs Coal & Brick Co., Elcan.....	169	17,655	2,200	19,855
Rosedale Coal & Clay Products Co., Rosedale.....	203	21,211	177	21,388
Tofield Coal Co., Tofield.....	284	21,351	1,200	22,551
Twin City Coal Co., Edmonton South.....	235	36,914	3,553	40,467
West Can. Collieries, Bellevue.....	228	389,960	16,471	406,431
" " " Blairmore.....	38	18,931	1,117	20,048
Two other companies each producing over 10,000 tons.....	.....	51,440	7,815	59,255
		3,063,680	296,383	3,360,063
All other companies each under 10,000 tons.....	.....	304,502	18,450	322,952
Total production, Alberta.....		3,368,182	314,833	3,683,015

*Includes consumption under boilers, etc., and coal used by workmen.

(a) Briquettes 107,809; (b) Briquettes 1,261; (c) For manufacture of coke 44,249.

Annual Production of Coal in Alberta.

Calendar Year.	Short tons.	Value.	Average per ton.	Calendar Year.	Short tons.	Value.	Average per ton.
1887.....	74,152	\$ 157,577	\$ 2.13	1901.....	340,275	\$ 850,687	\$ 2.50
1888.....	115,124	183,354	1.59	1902.....	402,819	960,601	2.38
1889.....	97,364	179,640	1.85	1903.....	495,893	1,117,541	2.25
1890.....	128,753	198,298	1.54	1904.....	661,732	1,404,524	2.12
1891.....	174,131	437,243	2.51	1905.....	931,917	1,993,915	2.14
1892.....	178,970	460,605	2.57	1906.....	1,246,360	2,614,762	2.10
1893.....	230,070	586,260	2.55	1907.....	1,591,579	3,836,286	2.41
1894.....	184,940	473,827	2.56	1908.....	1,685,661	4,127,311	2.45
1895.....	169,885	382,526	2.25	1909.....	1,994,741	4,838,109	2.43
1896.....	209,162	581,832	2.78	1910.....	2,894,469	7,065,736	2.44
1897.....	242,163	630,408	2.60	1911.....	1,511,036	3,979,264	2.63
1898.....	315,088	788,720	2.50	1912.....	3,240,577	8,113,525	2.50
1899.....	309,600	774,000	2.50	1913.....	4,014,755	10,418,941	2.59
1900.....	311,450	778,625	2.50	1914.....	3,683,015	9,350,392	2.54
				1915.....	3,360,818	8,283,079	2.46

Statistics collected and published by Mr. John T. Stirling, Chief Inspector of Coal Mines, in Alberta, covering coal mining operations in 1915, are given in the following tables:—

The output as given by Mr. Stirling is 3,434,891 tons, or after deducting 134,922 tons of slack put on waste heap, 3,299,969 tons of marketable coal.

For inspection purposes the Province is divided into four districts, the outputs of which were as follows: Crowsnest Pass district, 919,383 tons; Calgary district, 943,897 tons; Lethbridge district, 719,728 tons; and Edmonton district, 851,883 tons. Compared with 1914 the Crowsnest Pass district showed a decreased output of 26 per cent, Calgary an increase of 10 per cent, Lethbridge a decrease of 8 per cent, and Edmonton a decrease of 9 per cent.

The total sales, including briquettes, were: 3,052,847 tons of which 2,201,558 tons were sold for consumption in Alberta; 57,614 tons for consumption in British Columbia; 702,893 tons for consumption in Saskatchewan; 65,735 tons for consumption in Manitoba; and 25,047 tons for export to the United States.

Output of Coal in Alberta, 1915.

(IN SHORT TONS.)

	Crowsnest pass.	Calgary.	Lethbridge.	Edmonton.	Total.
Sold for consumption in Alberta.....	728,298	574,376	186,151	640,305	2,129,130
Sold for consumption in other prov- inces.....	80,736	190,058	432,516	112,264	815,574
Sold for export to the United States..	20,724	917	3,406	.....	25,047
Total sales.....	829,758	765,351	622,073	752,569	2,969,751
Used in making briquettes.....	.....	50,222	.....	.....	50,222
Used in making coke.....	38,878	.....	.....	.....	38,878
Used under colliery boilers.....	50,970	54,979	85,240	54,339	245,528
Difference in stocks.....	— 448	— 2,682	— 1,294	+ 14	— 4,410
Slack put on waste heap.....	225	76,027	13,709	44,961	134,922
Total output.....	919,383	943,897	719,728	851,883	3,434,891

Output of Bituminous Coal in Alberta, 1915.

(IN SHORT TONS.)

	Crowsnest pass.	Calgary.	Lethbridge.	Edmonton.	Total.
Sold for consumption in Alberta.....	728,298	396,480	.....	230,915	1,355,693
Sold for consumption in other prov- inces.....	80,736	23,471	.....	7,871	112,078
Sold for export to the United States..	20,724	64	.....	.....	20,788
Total sales.....	829,758	420,015	.....	238,786	1,488,559
Used in making coke.....	38,878	.....	.....	.....	38,878
Used under colliery boilers.....	50,970	21,163	.....	12,958	85,091
Difference in stocks.....	— 448	— 100	.....	— 2,519	— 3,067
Slack put on waste heap.....	225	12,281	.....	4,270	16,776
Total.....	919,383	453,359	.....	253,495	1,626,237

Output of Anthracite Coal in Alberta, 1915.

(IN SHORT TONS.)

	CALGARY DISTRICT.	
	Coal.	Briquettes.
Sold for consumption in Alberta.....	21,159	72,428
Sold for consumption in other provinces.....	26,062	10,668
Sold for export to the United States.....	853	.....
Total sales.....	48,074	83,096
Used under colliery boilers.....	20,797	159
Used in making briquettes.....	50,222	.....
Difference in stock.....	— 2,203	— 75
Stock put on waste heap.....	8,842	.....
Total.....	125,732	83,180

Output of Lignite Coal in Alberta, 1915.

(IN SHORT TONS.)

	Crownsnest pass.	Calgary.	Lethbridge.	Edmonton.	Total.
Sold for consumption in Alberta.....	156,737	186,151	409,390	752,278
Sold for consumption in other prov- inces.....	140,525	432,516	104,393	677,434
Sold for export to the United States..	3,406	.....	3,406
Total sales.....	297,262	622,073	513,783	1,433,118
Used under colliery boilers.....	13,019	85,240	41,381	139,640
Slack put on waste heap.....	54,904	13,709	40,691	109,304
Difference in stocks.....	— 379	— 1,294	+ 2,533	+ 860
Total output.....	364,806	719,728	598,388	1,682,922

Sales of Coal and Briquettes by Districts, 1915.

(IN SHORT TONS.)

District.	SOLD FOR CONSUMPTION IN				For export to United States.	Total.
	Alberta.	British Columbia.	Saskatche- wan.	Manitoba.		
<i>Bituminous.</i>						
Crowsnest Pass.....	725,316	7,701	71,439	1,596	20,724	826,776
Pincher Creek.....	2,982					2,982
Okotoks.....	247					247
Aldersyde.....	11,565					11,565
Banff.....	160,990	15,368	5,683	2,420	64	184,525
Brazeau.....	223,678					223,678
Yellowhead Pass.....	148,488	384	7,307	120		156,299
Jasper Park.....	82,427		60			82,487
Total Bituminous.	1,355,693	23,453	84,489	4,136	20,788	1,488,559
<i>Anthracite and Briquettes.</i>						
Bankhead.....						
Coal.....	21,159	16,307	9,496	259	853	48,074
Briquettes.....	72,428	2,754	6,995	919		83,096
Total Anthracite..	93,587	19,061	16,491	1,178	853	131,170
<i>Lignite.</i>						
Wetaskiwin.....	33,467		22,336			55,803
Edmonton.....	208,394		17,915	442		226,751
St. Albert.....	9,327		656			9,983
Tofield.....	38,509		6,435	1,089		44,944
Cardiff.....	98,190	495	45,038			144,812
Pembina.....	21,503		9,987	45,144	1,201	31,490
Lethbridge.....	163,801	13,030	322,809	8,660	2,205	545,985
Taber.....	9,844	1,515	41,358			63,582
Bow Island.....	8,081					8,081
Milk River.....	4,425					4,425
Medicine Hat.....	17,827		3,510			21,337
Carbon.....	10,750		1,500			12,250
Trochu.....	2,105					2,105
Drumheller.....	82,529	60	128,220	5,086		215,895
Three Hills.....	1,940					1,940
Lacombe.....	41,586		2,149			43,735
Total Lignite.....	752,278	15,100	601,913	60,421	3,406	1,433,118
	2,201,558	57,614	702,893	65,735	25,047	3,052,847

Average Number of Persons Employed in Alberta Coal Mines.

Character of labour.	Bituminous.		Anthracite.		Lignite.		Total.	
	Above.	Below.	Above.	Below.	Above.	Below.	Above.	Below.
Supervision and clerical assistance.....	104	109	9	8	135	141	248	258
Miners and helpers.....		1,260		119		1,441		2,820
Mechanics or skilled labour....	167	87	54	1	219	93		181
Other employees.....	547	647	100	52	617	535	1,264	1,234
Total, 1915.....	818	2,103	163	180	971	2,210	1,952	4,493

British Columbia.

The production of coal in British Columbia in 1915 was 2,065,613 tons, as compared with 2,239,799 tons in 1914, a falling off of 174,186 tons or 7·8 per cent, and is the lowest recorded since 1905.

The Provincial Mineralogist states: "The consumption of coal in the Province during the past two years has been sadly interfered with by the war, through its retarding or stopping of many industries; this has had a reflex action on the transportation lines, which are the largest consumers of coal."

"The market for the Coast collieries was seriously affected by the diminished sales of bunker coal to ocean steamers, as a result of war conditions on the Pacific Ocean steamer trade."

"The competition of fuel-oil has been keenly felt, and the adoption of this fuel by the three transcontinental railways for use in British Columbia has removed a steady and growing market for coal."

Of the total production in 1915, 1,471,328 tons were reported as sales including 739,881 tons sold for consumption in Canada; 705,779 tons sold for export to the United States; and 25,668 tons sold for export to other countries; 594,285 tons were used by producers, including 404,825 tons for making coke, and 189,460 tons for the operation of collieries and for workmen.

The production of collieries on Vancouver Island was 1,008,468 tons, of which 559,587 tons were sold for consumption in Canada, 292,669 tons for export to the United States, and 25,668 tons for export to other countries, 20,115 tons were used in the coke ovens at Comox, and 110,429 tons were used in the operation of collieries and by workmen. Vancouver Island collieries produced 48·8 per cent of the production of the Province, while compared with the previous year there was a decrease of 9,215 tons or less than one per cent.

The production in the Crowsnest district was 951,289 tons of which 91,867 tons were sold for consumption in Canada, and 407,817 tons for export to the United States; 384,710 tons were used for making coke, and 66,895 tons were used in the operation of collieries and by workmen. This district contributed 46 per cent of the total in 1915, and the production was less than that of 1914 by 115,435 tons, or over 10 per cent.

The production at Nicola and Princeton, etc., was 105,856 tons of which 88,427 tons were sold for consumption in Canada, and 5,293 tons for export to the United States, and 12,136 tons were used in the operation of collieries and by workmen. These areas contributed a little over 5 per cent of the total and the production showed a decrease of 49,536 tons or 31·8 per cent, compared with 1914.

The three largest operators were the Crow's Nest Pass Coal Company with 888,745 tons, the Canadian Collieries (Dunsmuir), Limited, with

370,291 tons, and the Western Fuel Company with 460,489 tons. These three companies contributed over 83 per cent of the Province's production.

Coal Production by Districts in British Columbia, 1915.

(IN SHORT TONS.)

Coal.	Vancouver Island.	Nicola and Princeton.	Crowsnest and East Kootenay.	Total.
Sold for consumption in Canada.....	559,587	88,427	91,867	739,881
Sold for export to United States.....	292,669	5,293	407,817	705,779
Sold for export to other countries.....	25,668	.....	.....	25,668
Total sales.....	877,924	93,720	499,684	1,471,328
Used for making coke or brick.....	20,115	.....	384,710	404,825
Used for colliery consumption, etc.....	110,429	12,136	66,895	189,460
Production.....	1,008,468	105,856	951,289	2,065,613

Coal Production by Districts in British Columbia, 1914.

(IN SHORT TONS.)

Coal.	Vancouver Island.	Nicola and Princeton.	Crowsnest and East Kootenay.	Total.
Sold for consumption in Canada.....	674,928	134,995	159,598	969,521
Sold for export to United States.....	236,004	3,006	436,109	675,119
Sold for export to other countries.....	.....	.....	.....	.....
Total sales.....	910,932	138,001	595,707	1,644,640
Used for making coke or brick.....	.....	.....	398,117	398,117
Used for colliery consumption, etc.....	106,751	17,391	72,900	197,042
Production.....	1,017,683	155,392	1,066,724	2,239,799

Coal Production by Collieries in British Columbia, in 1915.

(IN SHORT TONS.)

Colliery.	SOLD.			USED.		Lost in washing, etc.	STOCKS.		Output.
	In Canada.	To United States.	To other countries.	Total.	Making coke.	Under colliery boilers, etc.	First of year.	Last of year.	
1. No. 1 Mine.....	157,125	230,665	2,463	390,253	.....	38,852	7,699	12,043	433,449
2. Reserve.....	8,459	6,571	59	15,089	.....	16,295	44	820	32,160
3. East Wellington No. 1.....	46,695	1,806	.....	48,501	.....	7,309	5,100	3,023	53,733
3. Wellington Extension Mine, Lady-Comox Mines, Cumberland.....	97,057	27,598	12,551	137,206	.....	14,688	4,737	10,653	187,007
4. South Wellington Mines.....	172,225	2,971	10,595	185,791	20,115	12,491	19,180	8,220	292,143
5. Michel.....	78,026	23,058	.....	101,084	.....	20,476	2,434	2,154	144,961
5. Coal Creek.....	41,028	105,312	.....	146,340	145,939	312,758	1,312	52	311,498
6. Corbin.....	47,154	247,465	.....	294,619	238,771	42,597	2,714	59	573,332
7. Inland.....	3,685	55,040	.....	58,725	.....	5,819	.....	.....	62,544
8. Inland.....	48,720	.....	.....	48,720	.....	5,819	.....	.....	53,987
9. Princeton.....	32,530	.....	.....	32,530	.....	2,474	.....	.....	35,004
10. Miscellaneous.....	6,054	5,293	.....	11,347	.....	4,598	.....	34	17,414
	1,123	.....	.....	1,123	.....	.....	.....	.....	1,123
	739,881	705,779	25,668	1,471,328	404,825	189,460	43,520	37,361	2,198,355

1. Western Fuel Company.
 2. Vancouver-Nanaimo Coal Mining Co.
 3. Canadian Collieries (Dunsmuir), Ltd.
 4. Pacific Coast Coal Mines, Ltd.
 5. Crow's Nest Pass Coal Co., Ltd.
 6. Corbin Coal and Coke Co., Ltd.
 7. Middlesboro Collieries, Ltd.
 8. Inland Coal and Coke Co., Ltd.
 9. Princeton Coal and Land Co., Ltd.
 10. Pacific Coast Colliery of B.C.

Coal Production by Collieries in British Columbia, in 1914.

(IN SHORT TONS.)

Colliery.	SOLD.			USED.		Production.	Lost in washing, etc.	STOCKS.		Output.
	In Canada.	To United States.	Total.	Making coke.	Under colliery boilers, etc.			First of year.	Last of year.	
1. Protection, No. 1.....	149,677	140,711	290,388	.....	49,505	339,893	.....	200	7,699	347,302
2. Northfield and Reserve.....	248	40	288	.....	10,495	783	.....	295	44	347,302
3. New East Wellington.....	100,294	8,111	108,405	.....	10,793	119,198	.....	4,279	5,099	120,018
4. Ladysmith (Wellington).....	88,396	16,953	105,349	.....	9,352	114,701	.....	830	4,738	144,722
5. Cumberland (Comox).....	247,616	54,005	301,621	.....	17,667	319,138	.....	11,636	19,130	442,098
6. Fiddick, Richardson, Squash and Morden.....	88,697	16,184	104,881	.....	19,039	123,920	.....	1,148	2,434	146,322
7. Michel.....	39,857	71,720	111,577	.....	18,466	223,925	.....	.....	1,312	225,237
8. Coal Creek.....	60,423	304,231	364,654	.....	41,522	643,965	.....	105	2,714	646,575
9. Hosmer.....	39,109	.....	39,109	.....	10,048	115,602	.....	330	0	132,336
10. Corbin.....	20,209	60,158	80,367	.....	2,864	83,231	.....	.....	.....	83,231
11. Middleboro.....	58,491	.....	58,491	.....	9,706	68,287	.....	688	366	67,963
12. Inland.....	57,782	.....	57,782	.....	2,952	60,734	.....	.....	.....	60,734
13. Princeton.....	14,862	2,806	17,668	.....	3,523	21,191	.....	45	0	21,772
14. Other mines.....	3,860	200	4,060	.....	1,120	5,180	.....	.....	.....	5,180
Total.....	969,521	675,119	1,644,640	398,117	197,042	2,239,799	180,305	19,666	43,586	2,444,024

1. Western Fuel Co.
2. Vancouver-Nanaimo Coal Mining Co.
3. Canadian Collieries (Dunsmuir), Ltd.
4. Pacific Coast Collieries, Ltd.
5. Crow's Nest Pass Coal Co., Ltd.
6. The Hosmer Mines Ltd.
- (Can. Pac. Railway, Dept. of Natural Resources.)

7. Corbin Coal and Coke Co., Ltd.
8. Nicola Valley Coal and Coke Co., Ltd.
9. Inland Coal and Coke Co., Ltd.
10. Princeton Coal and Land Co., Ltd.
11. Coalmont Collieries, Ltd.
- (Pacific Coast Colliery Co. of B.C.)

Annual Production of Coal in British Columbia.

Calendar Year.	Output.	Home consumption.	Sold for export.	PRODUCTION*.		Price per long ton.	Value.
				Long tons.	Short tons.		
1836-52....	10,000				11,200	\$4.00	\$ 40,000
1852-59....	25,398				28,446	4.00	101,592
1859†....	1,989				2,228	4.00	7,956
1860.....	14,247				15,957	4.00	56,988
1861.....	13,774				15,427	4.00	55,096
1862.....	18,118				20,292	4.00	72,472
1863.....	21,345				23,906	4.00	85,380
1864.....	28,632				32,068	4.00	114,528
1865.....	32,819				36,757	4.00	131,276
1866.....	25,115				28,129	4.00	100,460
1867.....	31,239				34,988	4.00	124,956
1868.....	44,005				49,286	4.00	176,020
1869.....	35,802				40,098	4.00	143,208
1870.....	29,843				33,424	4.00	119,372
1871-2-3....	148,459				166,274	4.00	593,836
1874.....	81,547	25,023	56,038	81,061	90,788	3.00	243,183
1875.....	110,145	31,252	66,392	97,644	109,361	3.00	292,932
1876.....	139,192	17,856	†122,329	140,185	157,007	3.00	420,555
1877.....	154,052	24,311	115,381	139,692	156,455	3.00	419,076
1878.....	170,846	26,166	164,682	190,848	213,750	3.00	572,544
1879.....	241,301	40,294	192,096	232,390	260,277	3.00	697,170
1880.....	267,595	46,513	225,849	272,362	305,045	3.00	817,086
From 1836 to 1873, inclusive, the output is taken as production.							
1881.....	228,357	40,191	189,323	229,514	257,056	3.00	688,542
1882.....	282,139	56,161	232,411	288,572	323,201	3.00	865,716
1883.....	213,299	64,786	149,567	214,353	240,075	3.00	643,059
1884.....	394,070	87,388	306,478	393,866	441,130	3.00	1,181,598
1885.....	365,596	95,227	237,797	333,024	372,987	3.00	999,072
1886.....	326,636	85,987	249,205	335,192	375,415	3.00	1,005,576
1887.....	413,360	99,216	334,839	434,055	486,142	3.00	1,302,165
1888.....	489,301	115,953	365,714	481,667	539,467	3.00	1,445,001
1889.....	579,830	124,574	443,675	568,249	636,439	3.00	1,704,747
1890.....	678,140	177,075	508,270	685,345	767,586	3.00	2,056,035
1891.....	1,029,097	202,697	806,479	1,009,176	1,130,277	3.00	3,027,528
1892.....	826,335	196,223	640,579	836,802	937,218	3.00	2,510,406
1893.....	978,294	207,851	768,917	976,768	1,093,980	3.00	2,930,304
1894.....	1,012,953	165,776	827,642	993,418	1,112,628	3.00	2,980,254
1895.....	939,654	188,349	756,334	944,683	1,058,045	3.00	2,834,049
1896.....	894,882	261,984	634,238	896,222	1,003,769	3.00	2,688,666
1897.....	802,296	290,310	619,860	910,170	1,019,390	3.00	2,730,510
1898.....	1,136,485	375,423	752,863	1,128,286	1,263,680	3.00	3,384,858
1899.....	1,306,324	526,058	751,711	1,277,769	1,431,101	3.00	3,833,307
1900.....	1,590,178	685,667	914,184	1,599,851	1,791,833	3.00	4,799,553
1901.....	1,691,557	799,666	914,163	1,713,829	1,919,488	3.00	5,141,487
1902.....	1,641,626	837,871	776,809	1,614,680	1,808,441	3.00	4,844,040
1903.....	1,450,663	947,499	549,449	1,496,948	1,676,581	3.00	4,490,844
1904.....	1,685,698	1,129,465	533,593	1,663,058	1,862,625	3.00	4,989,174
1905.....	1,736,696	1,089,667	647,343	1,737,010	1,945,452	3.00	5,211,030
1906.....	1,899,076	1,236,476	679,829	1,916,305	2,146,262	3.00	5,748,915
1907.....	2,219,602	1,438,402	673,114	2,111,516	2,364,898	3.50	7,390,306
1908.....	2,111,931	1,486,511	597,157	2,083,668	2,333,708	3.50	7,292,838
1909.....	2,388,196	1,585,232	741,667	2,326,899	2,606,127	3.50	8,144,147
1910.....	3,152,207	1,798,873	1,175,007	2,973,880	3,330,745	3.50	10,408,580
1911.....	2,304,794	1,657,422	612,696	2,270,118	2,542,532	3.50	7,945,413
1912.....	2,857,345	1,898,213	966,963	2,865,176	3,208,997	3.50	10,028,116
1913.....	2,587,357	1,799,643	623,946	2,423,589	2,714,420	3.50	8,482,562
1914.....	2,182,164	1,397,036	602,785	1,999,821	2,239,799	3.50	6,999,374
1915.....	1,962,817	1,191,219	653,078	1,844,297	2,065,613	3.50	6,455,041

*This production is obtained by adding "Home Consumption" and "Sold for Export."

†52,935 tons of this amount were exported as sales without the division into "Home Consumption" and "Sold for Export."

‡Two months only.

Yukon.

The total production was 9,724 tons from two companies, the Five Fingers Coal Company, operating at Tantalus, and the Northern Light, Power and Coal Company, on Coal Creek.

Annual Production of Coal in Yukon Territory.

Calendar Year.	Short tons.	Value.	Average per ton.
1901.....	*5,864	\$ 86,230	\$14.70
1902.....	4,910	37,280	7.59
1903.....	1,849	29,584	16.00
1904.....			
1905.....	7,000	21,000	3.00
1906.....	7,000	28,000	4.00
1907.....	15,000	60,000	4.00
1908.....	3,847	21,158	5.50
1909.....	7,364	49,502	6.72
1910.....	16,185	110,925	6.85
1911.....	2,840	12,780	4.50
1912.....	9,245	44,958	4.86
1913.....	19,722	95,945	4.86
1914.....	13,443	53,760	4.00
1915.....	9,724	38,896	4.00

*Part of this production was mined in 1900.

COKE.

Both domestic and imported coal are used in the manufacture of coke in Canadian coke-oven plants.

In 1915, 1,425,172 tons of domestic and 431,221 tons of imported coal were charged to coke ovens from which was obtained an output of 1,200,766 tons of coke, thus averaging 0.647 tons of coke per ton of coal charged. Coke from by-product ovens comprised 66 per cent of the total.

In 1914, 1,038,235 tons of domestic, and 503,312 tons of imported coal were used to produce an output of 1,015,253 tons of coke, showing a return of 0.658 tons of coke per ton of coal charged. Coke from by-product ovens comprised 67 per cent of the total.

In 1913 there were 1,698,912 tons of domestic coal, and 549,001 tons of imported coal used to produce an output of 1,517,133 tons of coke.

The amount of coke sold or used by coke producers in 1915 was 1,170,473 as compared with 1,023,860 tons in 1914, an increase of 146,613 tons or over 18 per cent.

In addition to the tonnage sold or used by producers there was imported during 1915, 637,857 tons of coke, while the exports totalled 35,869 tons. The Canadian consumption for 1915 was therefore 1,772,461 tons, an increase of 263,393 tons or 17 per cent over the consumption in 1914. The consumption of oven coke during recent years has been as follows: 1,285,228 tons in 1908; 1,449,369 tons in 1909; 1,581,832 tons in 1910; 1,677,188 tons in 1911; 1,981,832 tons in 1912; 2,186,170 tons in 1913; and 1,509,068 tons in 1914.

At the close of the year there were 921 ovens idle and 1,742 in operation.

Coke Production, 1915.

(IN SHORT TONS).

Province.	Coal charged to ovens.	Coke output.	STOCK ON HAND.		Coke sold or used.	Per cent of total production.	Value of coke sold or used.
			Jan. 1.	Dec. 31.			
Nova Scotia.....	981,369	584,993	2,621	1,741	585,873	50.05	\$1,905,766
Ontario.....	(a) 431,221	316,211	2,953	33,913	285,251	24.37	1,141,004
Alberta.....	38,878	24,187	.....	361	23,826	2.04	95,304
British Columbia.....	404,925	275,375	3,097	2,949	275,523	23.54	1,116,506
Total.....	1,856,393	1,200,766	8,671	38,964	1,170,473	100.00	4,258,580

(a) All imported coal.

Coke Production, 1914.

(IN SHORT TONS.)

Province.	Coal charged to ovens.	Coke output.	STOCK ON HAND.		Coke sold or used.	Per cent of total production.	Value of coke sold or used.
			Jan. 1.	Dec. 31.			
Nova Scotia.....	595,868	345,880	3,386	5,877	343,289	33.53	\$1,118,614
Ontario.....	(a) 503,312	377,514	11,753	2,953	386,314	37.73	1,352,099
Alberta.....	44,249	28,541	518	0	29,059	2.84	116,236
British Columbia.....	398,118	263,318	4,977	3,097	265,198	25.90	1,071,565
Total.....	1,541,547	1,015,253	20,634	12,027	1,023,860	100.00	3,658,514

(a) All imported coal.

Distribution of Coke Production, 1915.

(IN SHORT TONS.)

	Nova Scotia.	Ontario.	Alberta.	British Columbia.	Total.
Sold in Canada.....	7,289	52,826	23,360	247,928	331,403
Sold for export.....			62	27,549	27,611
Total sales.....	7,289	52,826	23,422	275,477	359,014
Used by maker in blast furnace or otherwise.....	578,584	232,425	404	46	811,459
Total sold or used.....	585,873	285,251	23,826	275,523	1,170,473
Number of ovens in operation December 31.....	638	110	75	919	1,742
Number of ovens idle December 31.....		100	292		
Number of ovens building December 31.....	0	0	0	0	0

Annual Production of Coke.

Calendar Year.	Short tons.	Value.	Average per ton.	Calendar Year.	Short tons.	Value.	Average per ton.
1886.....	35,396	\$ 101,940	\$ 2.88	1901.....	365,531	\$1,228,225	\$ 3.36
1887.....	40,428	135,951	3.36	1902.....	502,043	1,519,185	3.03
1888.....	45,373	134,181	2.96	1903.....	561,318	1,734,404	3.09
1889.....	54,539	155,043	2.84	1904.....	554,083	2,032,048	3.66
1890.....	56,450	166,298	2.95	1905.....	700,488	2,436,211	3.48
1891.....	57,084	175,592	3.08	1906.....	782,055	2,863,503	3.66
1892.....	56,135	160,249	2.85	1907.....	842,003	3,583,468	4.26
1893.....	61,078	161,790	2.65	1908.....	858,257	3,449,361	4.02
1894.....	58,044	148,551	2.56	1909.....	862,011	3,484,393	4.04
1895.....	53,356	143,047	2.68	1910.....	902,715	3,462,872	3.84
1896.....	49,619	110,257	2.22	1911.....	935,651	3,630,410	3.88
1897.....	60,686	176,457	2.91	1912.....	1,411,229	5,164,331	3.66
1898.....	87,600	286,000	3.26	1913.....	1,530,499	5,919,596	3.87
1899.....	100,820	350,022	3.47	1914.....	1,023,860	3,658,514	3.55
1900.....	157,134	649,140	4.13	1915.....	1,170,473	4,258,580	3.64

Annual Production of Coke by Provinces.

Calendar Year.	NOVA SCOTIA.		ONTARIO.		ALBERTA.		BRITISH COLUMBIA.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
1897.....	41,532	\$ 90,950	.....	.....	.....	.....	19,154	\$ 85,507
1898.....	48,400	111,000	.....	.....	.....	.....	39,200	175,000
1899.....	62,459	178,767	.....	.....	.....	.....	38,361	171,255
1900.....	61,767	223,395	.....	.....	.....	.....	95,367	425,745
1901.....	222,694	590,560	.....	.....	.....	.....	142,837	637,665
1902.....	363,330	899,930	.....	.....	.....	.....	138,713	619,255
1903.....	371,745	888,094	.....	.....	.....	.....	189,753	846,310
1904.....	275,927	808,022	.....	.....	20,984	\$ 78,936	257,172	1,148,090
1905.....	386,366	1,054,712	.....	.....	44,866	179,464	269,256	1,202,035
1906.....	476,364	1,540,976	.....	.....	69,486	268,042	236,205	1,054,485
1907.....	524,110	1,688,070	.....	.....	76,321	297,595	241,572	1,049,432
1908.....	505,929	1,658,151	.....	.....	75,645	309,019	276,683	1,482,191
1909.....	492,992	1,608,092	.....	.....	87,233	366,734	281,786	1,509,56 7
1910.....	508,058	1,655,775	24,685	\$ 148,110	121,578	486,312	248,394	1,172,675
1911.....	557,554	1,814,977	259,554	1,318,303	36,216	146,251	82,327	350,879
1912.....	625,918	1,840,129	379,854	1,709,343	105,684	424,027	299,773	1,190,832
1913.....	722,038	2,352,153	419,287	1,991,613	67,403	269,612	321,771	1,306,218
1914.....	343,289	1,118,614	386,314	1,352,099	29,059	116,236	265,198	1,071,565
1915.....	585,873	1,905,766	285,251	1,141,004	23,826	95,304	275,523	1,116,506

Annual Exports of Coke.

Calendar Year.	Short tons.	Value.	Calendar Year.	Short tons.	Value.
1897.....	2,987	\$ 6,078	1906.....	37,003	\$ 168,571
1898.....	3,774	8,394	1907.....	70,617	320,357
1899.....	5,557	18,726	1908.....	58,708	248,759
1900.....	41,529	131,278	1909.....	74,067	329,051
1901.....	57,505	176,990	1910.....	57,971	250,715
1902.....	62,568	180,920	1911.....	9,852	39,823
1903.....	32,608	135,957	1912.....	57,744	252,763
1904.....	102,463	345,031	1913.....	68,235	308,410
1905.....	116,071	509,908	1914.....	67,838	306,117
			1915.....	35,869	160,053

Annual Imports of Oven Coke.

Fiscal Year.	Short tons.	Value.	Fiscal Year.	Short tons.	Value.
1880.....	3,837	\$ 19,353	1898.....	135,060	\$ 347,040
1881.....	5,492	26,123	1899.....	141,284	362,826
1882.....	8,157	36,670	1900.....	178,878	506,839
1883.....	8,943	38,588	1901.....	308,786	680,138
1884.....	11,207	44,518	1902.....	267,142	842,815
1885.....	11,564	41,391	1903.....	256,723	1,222,756
1886.....	11,858	39,756	1904.....	221,050	765,123
1887.....	15,110	56,222	1905.....	371,593	807,842
1888.....	25,487	102,334	1906.....	480,222	1,311,375
1889.....	29,557	91,902	Calendar Year.		
1890.....	36,564	133,344	1907.....	624,649	2,206,084
1891.....	38,533	177,605	1908.....	426,971	1,135,125
1892.....	43,499	194,429	1909.....	661,425	1,508,627
1893.....	41,821	156,277	1910.....	737,088	1,908,725
1894.....	42,864	176,996	1911.....	751,389	1,843,248
1895.....	43,235	149,434	1912.....	628,174	1,702,856
1896.....	61,612	203,826	1913.....	723,906	2,180,830
1897.....	83,330	267,540	1914.....	553,046	1,585,259
			1915.....	637,857	1,608,464

†Duty free.

In Nova Scotia, coke was made at Sydney, Sydney Mines, and Westville.

In Ontario, the Atikokan Iron Company's plant at Port Arthur was idle throughout the year. The whole production of the Province came, therefore, from the Algoma Steel Corporation's plant at Sault Ste. Marie.

In Alberta, the plants at Lille and Passburg were idle, and one at Coleman was in operation part of the year.

In British Columbia, coke was made by the Crow's Nest Pass Coal Company at Fernie and Michel, and by the Canadian Collieries (Dunsmuir), Limited, at Union Bay.

The coke production of the eastern provinces is used almost entirely in the iron and steel industry, while that of the western provinces is used chiefly by the copper and lead smelters, finding a market in the United States as well as in Canada.

In Nova Scotia at the close of 1915 there were 638 ovens in operation, and 168 idle. The Dominion Iron and Steel Company had 488 of its 620 ovens in operation. All these ovens are of the Otto-Hoffman by-product type, from which are recovered tar, sulphate of ammonia, and gas. The gas is used in the Company's steel plant operations, and the sulphate of ammonia in the crystallized state is disposed of to the trade. Benzol, toluol, and other hydro-carbons are also being recovered. The crude tar is sold to the Dominion Tar and Chemical Company, who have a plant close at hand for the separation of a variety of coal-tar products. All the ovens of the Nova Scotia Steel and Coal Company were in operation at the close of the year. The surplus gas from the Bauer ovens is used in generating steam for general colliery use, while that from the Bernard ovens is used for the production of steam for the power generating plant. The ovens formerly operated at Stellarton (45) and Londonderry (97) are not included amongst those idle, being regarded as abandoned.

In Ontario, the Atikokan Iron Company's 100 Beehive ovens at Port Arthur were idle throughout the year, but the Algoma Steel Company's 110 Koppers Regenerative By-Product ovens at Sault Ste Marie were in operation most of the year, none being idle on December 31. At the Sault Ste. Marie plant, crude tar, crystallized sulphate of ammonia, and gas are recovered. Benzol, toluol, and other hydro-carbons were recovered by the Toronto Chemical Company, a branch of the Dominion Tar and Chemical Co. The latter Company also takes the tar which is treated for the separation of coal-tar products.

In Alberta, all of the Western Canadian Collieries' 50 Bernard ovens at Lille, all of the Leitch Collieries' 101 Mitchell rectangular ovens at Passburg, and some of the International Coal and Coke Company's 216 Beehive ovens at Coleman, were idle throughout the year. The latter Company had 75 ovens in operation on December 31.

In British Columbia at the end of the year the Crow's Nest Pass Coal Company had only 20 of its 454 Beehive ovens, at Fernie, idle, and 101 of its 486, at Michel, idle; its 240 Beehive ovens at Carbonade have been idle for some years and are now regarded as permanently abandoned. The 240 Beehive ovens at Hosmer, were idle throughout the year. On Vancouver island the Canadian Collieries (Dunsmuir) Limited rebuilt and placed in operation 100 ovens at Union Bay and all were in operation at the end of the year.

The exports of coke in 1915 were 35,869 tons, all from British Columbia, a falling off of nearly 50 per cent from the exports of 1914.

Coke-Oven By-Products.

Coke-oven by-products were recovered at Sydney, N.S., and Sault Ste. Marie, Ontario. The 1915 recoveries included 7,365,931 gallons of tar, 10,448 tons of sulphate of ammonia, together with important quantities of benzol, toluol, and solvent naphthas. In 1914 the recoveries were 5,714,172 gallons of tar, and 8,572 tons of sulphate of ammonia.

Annual Production of Coke-Oven By-products.

Year.	Tar.	Sulphate of ammonia.	Year.	Tar.	Sulphate of ammonia.
	Gallons.	Short tons.		Gallons.	Short tons.
1901.....	2,662,612	1,614	1908.....	4,450,166	3,342
1902.....	4,094,135	2,393	1909.....	4,016,824	3,416
1903.....	3,281,249	3,207	1910.....	3,963,591	3,491
1904.....	1,649,197	1,773	1911.....	6,464,155	7,124
1905.....	3,407,784	2,500	1912.....	8,428,896	11,289
1906.....	3,725,723	2,364	1913.....	8,371,600	10,608
1907.....	4,424,615	1,738	1914.....	5,714,172	8,572
			1915.....	7,365,931	10,448

FELDSPAR.

The production of feldspar in 1915 was 14,559 tons, valued at \$57,801, or an average of \$3.97 per ton, as compared with a production in 1914 of 18,060 tons, valued at \$70,824, or an average of \$3.92 per ton.

Almost all the feldspar shipped from Canadian mines goes to United States consumers, the 1914 exports being 18,072 tons, valued at \$74,100, or an average of \$4.10 per ton. The exports during 1915 have not been separately recorded having been grouped in the Customs classification with talc.

Statistics of production and exports of feldspar are given in the following table:—

Production and Exports of Feldspar.

Calendar Year.	PRODUCTION.			EXPORTS.		
	Tons.	Value.	Average.	Tons.	Value.	Average.
1890.....	700	\$3,500	5.00			
1891.....	685	3,425	5.00			
1892.....	175	525	3.00			
1893.....	575	4,525	7.87	50	\$ 500	10.00
1894.....	Nil.	Nil.		Nil.	Nil.	
1895.....		*2,545			2,545	
1896.....	972	*2,583	2.66	972	2,583	2.66
1897.....	1,400	3,290	2.35	3,078	5,637	1.83
1898.....	2,500	6,250	2.50	1,542	4,396	2.85
1899.....	3,000	6,000	2.00	1,757	5,126	2.92
1900.....	318	1,112	3.50	379	1,116	2.94
1901.....	5,350	10,700	2.00	4,367	10,973	2.51
1902.....	7,576	15,152	2.00	7,374	13,708	1.86
1903.....	13,928	18,966	1.36	13,760	23,319	1.69
1904.....	11,083	22,166	2.00	13,960	29,263	2.10
1905.....	11,700	23,400	2.00	9,161	27,660	3.02
1906.....	16,948	40,890	2.41	18,183	60,312	3.32
1907.....	12,584	29,819	2.37	12,068	37,932	3.14
1908.....	7,877	21,099	2.68	9,524	34,045	3.57
1909.....	12,783	40,383	3.16	10,834	35,234	3.25
1910.....	15,809	47,667	3.02	15,601	47,962	3.07
1911.....	17,723	51,939	2.93	16,150	56,085	3.47
1912.....	13,733	30,916	2.25	12,779	44,114	3.45
1913.....	16,790	60,795	3.62	15,966	62,767	3.93
1914.....	18,060	70,824	3.92	18,072	74,100	4.10
1915.....	14,559	57,801	3.97	**	**	.....

* Exports.

** Not separately stated.

The Canadian production of feldspar comes chiefly from the counties of Frontenac and Lanark in Ontario, the Kingston Feldspar Mining Co., Kingston, and the Canada Feldspar Corporation, Ltd., Verona, being the principal shippers. For several years there have been small shipments by Messrs. O'Brien and Fowler, Ottawa, from the Villeneuve mine, Township of Villeneuve, Labelle county, Quebec, where an exceptionally pure white feldspar, suitable for the manufacture of artificial teeth has been mined. Deposits in Ottawa county, Quebec, have been operated in past years to some extent, and in 1915 there were shipments from lots 13a and 14a, Range XIV, Township of Hull, operated under lease from P. M. Côté, and also from lot 14, Range II of East Templeton, operated by the Eureka Flint & Spar Co., of Trenton, N.J.

FLUORSPAR.

There have been no shipments of fluorspar reported since 1912. During 1915, however, some development work was undertaken during the last two months of the year by Messrs. Cross and Wellington, on the Perry property on lot 11, Concession XIII, Huntingdon township, Hastings county, Ontario, this firm having made a contract to ship a considerable tonnage of fluorspar during 1916.

Several occurrences of fluorspar are known near Madoc, in Huntingdon and Madoc townships, in Hastings county, Ontario. In 1905, Mr. Stephen Wellington opened a deposit on Lot I, Con. IV, Madoc township, and made a shipment of 12 tons to Port Hope, Ontario. In 1910 Messrs. Gillespie and Wellington mined from a deposit on Lot 10, Con. XIV, of the Township of Huntingdon, about 200 tons of material from which 2 tons of fluorspar valued at \$15 were shipped. Additional work in succeeding years resulted in shipments in 1911 of 34 tons, valued at \$238, to the smelter at Deloro, and to steel foundries at Welland, and in 1912 of 40 tons, valued at \$240 to the Copper Cliff smelter. This property, known as the Rogers Fluorspar mine, is now owned by Messrs. Cross and Wellington, Madoc, who have, however, abandoned operations thereon, to re-open the Perry mine on lot 11, Con. XIII. Other occurrences of fluorspar have been noted on lot 12, Con. XIII, of Huntingdon township, and on lot 2, Con. III, Madoc township.

Imports of fluorspar are not shown separately in the Reports of the Customs Department. The consumption in steel works though is considerable and reports from steel companies covering their operations show the consumption from 1910 to 1915 inclusive, to have been respectively: 7,461 tons, 8,067 tons, 9,709 tons, 10,687 tons, 7,842 tons, and 13,520 tons.

Imports of hydrofluosilicic acid used in the lead refinery at Trail, B.C., during recent years have been as follows:—

Imports of Hydrofluosilicic Acid.

Calendar year.	Pounds.	\$
1910.....	187,785	10,813
1911.....	223,706	9,173
1912.....	302,918	24,891
1913.....	1,182,293	46,517
1914.....	1,384,087	41,576
1915.....	1,117,874	36,085

The Consolidated Mining and Smelting Company, operators of the Trail smelter have recently added to their smelting plant an acid plant for the manufacture of hydrofluosilicic acid and it is reported that the fluorspar required will be imported from United States sources.

The production of fluorspar in the United States in 1915 as reported by the Mineral Resources of the U.S., Geological Survey, was 136,941 tons, valued at \$764,475.

GRAPHITE.

The total shipments of milled or refined graphite in 1915 by Canadian producers was 2,635 tons, valued at \$124,223, or an average of \$47.14 per ton, as compared with shipments in 1914 of 1,647 tons, valued at \$107,203, or an average of \$65.10 per ton.

The value of the 1915 shipments showed an increase of 15.8 per cent over the value of the 1914 shipments, and is the largest recorded.

The following table gives statistics of annual production since 1886.

Annual Production of Graphite.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886.....	500	\$4,000	1901.....	2,210	\$ 38,780
1887.....	300	2,400	1902.....	1,095	28,300
1888.....	150	1,200	1903.....	728	23,745
1889.....	242	3,160	1904.....	452	11,760
1890.....	175	5,200	1905.....	541	16,735
1891.....	260	1,560	1906.....	387	18,300
1892.....	167	3,763	1907.....	579	16,000
1893.....	Nil.	Nil.	1908.....	251½	5,565
1894*.....	3	223	1909.....	864	47,800
1895.....	220	6,150	1910.....	1,392	74,087
1896.....	139	9,455	1911.....	1,269	69,576
1897.....	436	16,240	1912.....	2,060	117,122
1898.....	.....	13,698	1913.....	2,162	90,282
1899.....	1,130	24,179	1914.....	1,647	107,203
1900.....	1,922	31,040	1915.....	2,635	124,223

* Exports.

In 1915, mills in the Buckingham district of Quebec shipped 75½ tons, valued at \$5,431, and mills at Harcourt, Wilberforce, and Calabogie, Ontario, made shipments aggregating 2,559½ tons, valued at \$118,792. In 1914, the Quebec shipments were 261 tons, valued at \$18,886, and the Ontario shipments 1,386 tons, valued at \$88,317.

The exports of graphite, according to Customs records, included 263 tons of crude ore and concentrates, valued at \$12,009, an average of \$45.62 per ton, together with manufactures of graphite, valued at \$84,316, or a total valuation of \$96,325. The exports in 1914 included crude ore and concentrates 919 tons, valued at \$50,528, an average of \$54.98 per ton, together with manufactures of graphite, valued at \$72,718, or a total value of \$123,246.

Exports of Graphite.

Year.	CRUDE ORE AND CONCENTRATES.		MANU-FACTURES.	Total value.
	Tons.	Value.	Value.	
1886.....				\$ 3,586
1887.....				3,017
1888.....				1,080
1889.....				538
1890.....				1,529
1891.....				72
1892.....				3,952
1893.....	1	\$ 38	\$ 10	48
1894.....	3	223		223
1895.....	544	4,803	30	4,833
1896.....	136	9,126	354	9,480
1897.....	205	2,988	1,337	4,325
1898.....	591	11,527	1,571	13,098
1899.....	1,237	19,326	3,164	22,490
1900.....	1,550	40,132	6,065	46,197
1901.....	1,194	30,535	4,567	35,102
1902.....	886	23,097	1,742	24,839
1903.....	412	26,230	17,412	43,642
1904.....	177	9,609	6,958	16,567
1905.....	254	7,596	518	8,114
1906.....	106	2,468	5,274	7,742
1907.....	121	3,036	2,847	5,883
1908.....	385	10,158	876	11,034
1909.....	1,004	52,438	864	53,302
1910.....	788	53,008	66,658	119,666
1911.....	813	43,249	33,956	77,205
1912.....	1,654	70,763	58,920	129,683
1913.....	1,642	85,368	24,284	109,652
1914.....	919	50,528	72,718	123,246
1915.....	263	12,009	84,316	96,325

Exports of Graphite by Countries.

Calendar Year.	CRUDE ORE AND CONCENTRATES.						MANUFACTURES OF PLUMBAGO.		
	Great Britain.		United States.		Other Countries.		Great Britain.	United States.	Other Countries.
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Value.	Value.	Value.
1909...	83	\$ 9,035	905	\$41,558	16	\$1,845			
1910...	223	16,453	556	35,555	9	1,000	\$ 3,051	\$63,466	\$ 141
1911...	30	3,631	752	36,295	31	3,323	2,289	30,062	1,605
1912...	59	4,984	1,550	62,680	45	3,099	3,932	46,796	8,192
1913...	19	1,700	1,618	82,758	5	910	3,278	20,279	727
1914...	77	6,730	814	41,168	28	2,630	12,051	58,816	1,851
1915.....			263	12,009			2,381	81,467	468

Statistics of imports of graphite are given in the next table. The imports during 1915 were valued at \$151,878, and comprised: plumbago, not ground, \$3,436; black-lead \$6,084; plumbago, ground, and manufactures of, \$35,579; and crucibles of clay or plumbago \$106,761. The imports during 1914 were valued at \$100,192, and comprised: plumbago, not ground, \$801; black-lead \$6,798; plumbago, ground and manufactures of, \$42,680, and crucibles of clay or plumbago \$49,913.

Imports of Raw and Manufactured Graphite.

Fiscal Year.	Plumbago not ground.	Black lead.	Ground and manufactures.	Crucibles, clay or plumbago.	Total.
1880.....	\$ 1,677	\$18,055	\$2,738		\$22,470
1881.....	2,479	26,544	1,202		30,225
1882.....	1,028	25,132	2,181		28,341
1883.....	3,147	21,151	2,141		26,439
1884.....	2,891	24,002	2,152		29,045
1885.....	3,729	24,487	2,805		31,021
1886.....	5,522	23,211	1,408		30,141
1887.....	4,020	25,766	2,830		32,616
1888.....	3,802	7,824	22,604		34,230
1889.....	3,546	11,852	21,789		37,187
1890.....	3,441	10,276	26,605		40,322
1891.....	7,217	7,292	26,201		41,710
1892.....	2,988	13,560	23,085		39,633
1893.....	3,293	16,595	23,051		42,939
1894.....	2,177	17,614	15,196	\$ 1,490	36,477
1895.....	2,586	13,922	16,361	5,627	38,496
1896.....	2,865	18,434	12,090	7,407	40,796
1897.....	1,406	17,863	14,768	5,906	39,943
1898.....	1,862	19,638	20,120	12,533	54,153
1899.....	4,979	21,334	22,140	14,350	62,803
1900.....	4,437	22,078	17,869	20,571	64,955
1901.....	2,357	25,646	11,016	38,874	77,893
1902.....	3,649	20,467	15,021	28,635	67,772
1903.....	2,870	22,559	12,493	34,624	72,546
1904.....	1,802	26,053	12,737	28,773	69,365
1905.....	2,499	30,743	13,192	31,353	77,787
1906.....	2,791	33,907	19,058	32,950	88,706
1907 (9 mos.).....	3,176	16,646	13,740	27,271	60,833
1908.....	3,030	9,042	31,428	40,092	83,592
1909.....	1,408	11,009	26,918	37,213	76,548
Calendar Year.					
1910.....	4,867	10,048	45,042	52,896	112,853
1911.....	4,940	14,172	37,020	56,814	112,946
1912.....	7,249	9,587	56,324	82,324	155,484
1913.....	9,375	8,633	64,254	73,971	156,233
1914.....	801	6,798	42,680	49,913	100,192
1915.....	3,436	6,084	35,597	106,761	151,878

The market for graphite in Great Britain and the United States is to some extent indicated by the imports into those countries, which, for 1914 and 1915, were as follows:—

Imports of Plumbago into Great Britain, 1914 and 1915.

	1914.			1915.		
	Tons. (short).	Value.	Per ton.	Tons (short).	Value.	Per ton.
Germany.....	1,590	\$ 64,941	\$40.84			
France.....	225	13,393	59.52	1,342	\$ 156,712	\$116.77
Madagascar.....	4,932	460,362	93.34	5,134	460,465	89.69
Italy.....	1,258	24,844	19.75	2,434	48,311	19.85
Austria-Hungary.....	96	3,669	38.22			
Japan.....	4,667	142,000	30.43	4,267	107,422	25.18
United States.....	431	33,994	78.87	867	92,038	106.16
Other foreign countries.....	282	9,174	32.53	4	146	36.50
British India.....				94	17,389	194.99
Ceylon and dependencies.....	2,938	277,818	94.56	6,352	775,547	122.10
Canada.....	187	14,172	75.79			
Other British possessions.....	2	146	73.00	110	10,390	94.46
Total.....	16,608	1,044,513	62.89	20,604	1,668,420	80.98

¹ British Trade Report.

Graphite Imported into the United States.*

	1913.		1914.		1915.	
	Short tons.	Value.	Short tons.	Value.	Short tons.	Value.
Ceylon.....	16,996	\$1,674,764	8,374	\$ 920,147	(a) 12,275	\$1,564,917
Mexico.....	4,435	198,000	4,259	190,075	1,680	75,000
Canada.....	1,662	98,665	1,806	92,536	2,995	116,407
Japan (Chosen via Japan).....	4,170	58,199	6,327	96,433	2,373	35,292
Austria-Hungary.....	660	9,957	78	1,258	.....	.....
Italy.....	236	4,061	254	3,203	27	994
Germany.....	90	4,034	.....	.....	.....	.....
England.....	.....	.....	381	42,446	(b) 2,216	261,321
France.....	.....	.....	194	20,278	(c) 1,432	181,236
Br. India.....	.....	.....	127	9,815	.....	.....
Madagascar.....	.....	.....	155	18,426	36	2,831
Netherlands.....	.....	.....	.....	.....	36	2,811
Other countries.....	630	62,111	47	3,644	5	354
	28,879	2,109,791	22,002	1,398,261	23,075	2,241,163

a Entered in reports of Department of Commerce as "Other British East Indies."

b Probably Ceylon graphite re-shipped from England.

c Probably Madagascar graphite re-shipped from France.

* Bureau of Foreign and Domestic Commerce of the Department of Commerce, Washington, published in "Mineral Resources of the United States, 1915," Geological Survey.

The following is a list of the principal firms operating graphite properties in recent years.

Operator and address.	LOCATION.			Mine office.
	County.	Township.	Range or concession and lot.	
<i>Quebec.</i>				
The Canadian Graphite Co., Ltd., Montreal, 34 Coristine Building.	Argenteuil...	Wentworth...	III 1A, 1B.....	Lachute
Graphite Limited, Montreal, 206 Milton St.	Labelle.....	Amherst.....	VI, VII 16	St. Remi
*The New Quebec Graphite Co., Ltd., Buckingham.	"	Buckingham.	IV 1, 2, 3, 4, 5...	d'Amherst.
Buckingham Graphite Co., Ltd., Buckingham.	"	Lochaber....	IV 28.....	" Box 262.
The Bell Graphite Co., Ltd., Friars House, London, Eng.	"	Buckingham.	VI 28.....	Buckingham.
Dominion Graphite Co., Toronto, 15 Wellington St. W.	"	"	V 1, 2, 3.....	Buckingham,
Peerless Graphite Co., 32 Thorndale Terrace, Rochester, N.Y.	"	"	V 20.....	" Box 185.
	"	"	IX, X 12, 13	In liquidation.
	"	"		Buckingham.
<i>Ontario.</i>				
*Black Donald Graphite Co., Calabogie..	Renfrew....	Brougham...	III, IV, near Whitefish Lake.	Calabogie.
*The Globe Graphite Mining and Refining Co., Port Elmsley.....	Lanark....	Elmsley N...	VI 23.....	Port Elmsley.
Tonkin-Dupont Graphite Co., Ltd., Wilberforce.	"	Burgess N...	V21; VI22.....	"
	Hastings...	Monteagle...	XIII 23.....	Maynooth.
*National Graphite Ltd., 18 Toronto St., Toronto.	Haliburton	Monmouth...	XVI S 4 35	Wilberforce.
New York Graphite Co., Harcourt.....	Hastings...	Monteagle...	XIII 24.....	Maynooth.
	Haliburton..	Cardiff.....	XXI.....	Harcourt.

* Operating in 1915.

GYPSUM.

In 1915, the total quantity of crude gypsum mined was 505,989 tons, as compared with 579,841 tons in 1914 and 684,726 tons in 1913. The quantity calcined in 1915 was reported as 84,763 tons, as compared with 138,212 tons in 1914, and 147,532 tons in 1913. The total shipments in 1915 were 474,815 tons, valued at \$854,929, and included 346,947 tons of "lump," valued at \$375,815, or an average of \$1.08 per ton; 48,735 tons of "crushed" valued at \$67,007, or an average of \$1.37 per ton; 6,455 tons of "fine ground" valued at \$22,767, or an average of \$3.53 per ton; and 72,678 tons of "calcined," valued at \$389,340, or an average of \$5.36 per ton.

The total shipments in 1914 were 516,880 tons, valued at \$1,156,207, which included 351,729 tons of "lump" valued at \$400,521, or an average of \$1.14 per ton; 49,441 tons of "crushed" valued at \$61,686, or an average of \$1.25 per ton; 6,097 tons of "fine-ground" valued at \$14,496, or an average of \$2.38 per ton, and 109,613 tons of "calcined" valued at \$679,504, or an average of \$6.20 per ton.

A report¹ on the gypsum industry in Canada has lately been issued by the Mines Branch of the Department of Mines, Ottawa. This describes in detail the operating deposits in the different provinces, and the methods of treatment followed in preparing gypsum for the market.

The total quantity of gypsum mined and the total quantity calcined during the past ten years is shown in the following table:—

Gypsum Mined and Gypsum Calcined.

(Short Tons.)

Year.	Total gypsum mined.	Gypsum calcined.	Year.	Total gypsum mined.	Gypsum calcined.
1905.....	443,569	26,855	1910.....	548,019	69,889
1906.....	492,759	28,831	1911.....	515,979	76,718
1907.....	489,962	34,752	1912.....	549,856	133,392
1908.....	375,444	48,727	1913.....	684,726	147,532
1909.....	493,068	63,670	1914.....	579,841	138,212
			1915.....	505,989	84,763

Over 68 per cent of the gypsum mined in 1915 was shipped in lump form as quarried, and of this over 90 per cent went to calcining mills in the United States. Almost all of the shipments of crude lump are made from the Maritime Provinces from which cheap transportation by water is easily secured. There was calcined 84,763 tons, or 16.75 per cent of the tonnage mined. There was shipped as crushed, and fine ground, 55,190 tons, or 10.9 per cent of the tonnage mined.

¹ Gypsum in Canada: Its Occurrence, Exploitation and Technology, L. H. Cole, Mines Branch, Dept. of Mines, Ottawa, Canada, 1915, No. 245.

In reporting the production of gypsum and gypsum products for 1914 and 1915, a modification of the classification of recent years has been adopted. Statistics of the shipments of crude and calcined gypsum since 1905, and of the annual production of gypsum products since 1886, are shown in the tables following:—

Shipments of Crude and Calcined Gypsum, 1914 and 1915.

Grade.	1914.			1915.		
	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
Lump.....	351,729	\$400,521	\$1.14	346,947	\$375,815	\$1.08
Crushed.....	49,441	61,686	1.25	48,735	67,007	1.37
Fine ground.....	6,097	14,496	2.38	6,455	22,767	3.53
Calcined.....	109,613	679,504	6.20	72,678	389,340	5.36
Total.....	516,880	1,156,207	2.24	474,815	854,929	1.80

Shipments of Crude and Calcined Gypsum, 1905-1913.

Calendar Year.	CRUDE (LUMP).			CRUDE (GROUND).			CALCINED.		
	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
1905...	412,155	\$409,146	\$0.99	3,255	\$ 8,779	\$2.70	26,748	\$168,243	\$6.29
1906...	442,132	473,960	1.07	3,195	9,823	3.07	23,695	159,511	6.73
1907...	454,668	473,831	1.04	6,732	16,268	2.42	24,521	156,815	6.40
1908...	298,188	307,532	1.03	9,504	25,468	2.68	33,272	242,701	7.29
1909...	423,474	457,038	1.08	8,814	26,159	2.97	40,841	326,435	7.99
1910...	469,573	508,686	1.08	6,121	17,390	2.84	49,552	408,370	8.24
1911...	449,823	481,077	1.07	7,149	23,125	3.23	61,411	489,192	7.97
1912...	453,577	525,345	1.16	15,487	29,244	1.89	109,394	770,031	7.04
1913...	499,460	615,493	1.23	10,281	20,576	2.00	126,629	811,670	6.41

Annual Production of Gypsum.

Calendar Year.	Tons.	Value.	Per ton.	Calendar Year.	Tons.	Value.	Per ton.
1886.....	162,000	178,742	1.10	1901.....	293,799	\$ 340,148	\$1.16
1887.....	154,008	157,277	1.02	1902.....	333,599	379,479	1.14
1888.....	175,887	179,393	1.01	1903.....	314,489	388,459	1.24
1889.....	213,273	205,108	0.96	1904.....	345,961	373,474	1.08
1890.....	226,509	194,033	0.86	1905.....	442,158	586,168	1.32
1891.....	203,605	206,251	1.01	1906.....	469,022	643,294	1.37
1892.....	241,048	241,127	1.00	1907.....	485,921	646,914	1.33
1893.....	192,568	196,150	1.02	1908.....	340,964	575,701	1.69
1894.....	223,631	202,031	0.90	1909.....	473,129	809,632	1.71
1895.....	226,178	202,608	0.89	1910.....	525,246	934,446	1.78
1896.....	207,032	178,061	0.86	1911.....	518,383	993,394	1.92
1897.....	239,691	244,531	1.02	1912.....	578,458	1,324,620	2.29
1898.....	219,256	232,515	1.06	1913.....	636,370	1,447,739	2.27
1899.....	244,566	257,329	1.05	1914.....	516,880	1,156,207	2.24
1900.....	252,101	259,009	1.02	1915.....	474,815	854,929	1.80

Annual Production of Gypsum by Provinces.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		ONTARIO.		MANITOBA.		BRITISH COLUMBIA.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
1887.....	116,346	\$116,346	29,102	\$ 29,216	8,560	\$ 11,715				
1888.....	124,818	120,429	44,369	48,764	6,700	10,200				
1889.....	165,025	142,850	40,866	49,130	7,382	13,128				
1890.....	181,285	154,972	39,024	30,986	6,200	8,075				
1891.....	161,934	153,955	36,011	33,996	5,660	18,300				
1892.....	197,019	170,021	39,709	65,707	4,320	5,399				
1893.....	152,754	144,111	36,916	41,846	2,898	10,193				
1894.....	168,300	147,644	52,962	48,200	2,369	6,187				
1895.....	156,809	133,929	66,949	63,839	2,420	4,840				
1896.....	136,590	111,251	67,137	59,024	3,305	7,786				
1897.....	155,572	121,754	82,658	118,116	1,461	4,661				
1898.....	132,086	106,610	86,083	121,704	1,087	4,201				
1899.....	126,754	102,055	116,792	151,296	1,020	3,978				
1900.....	138,712	108,828	112,294	145,850	1,095	4,331				
1901.....	170,100	136,947	121,595	189,709	1,504	5,692	600	\$ 7,800		
1902.....	206,087	181,425	124,041	170,153	1,917	7,699	1,554	20,202		
1903.....	189,427	173,881	119,182	172,080	2,720	21,988	3,160	20,510		
1904.....	218,580	153,600	190,991	187,524	2,390	18,350	4,000	14,000		
1905.....	272,252	298,248	163,553	232,586	1,853	23,834	4,500	31,500		
1906.....	333,312	345,414	131,246	250,960	2,965	24,420	3,200	22,500		
1907.....	357,411	380,859	118,106	213,638	10,404	52,417				
1908.....	234,455	230,433	81,620	191,312	10,389	42,456	14,500	111,500		
1909.....	345,682	364,379	98,716	226,975	11,731	48,278	17,000	170,000		
1910.....	400,455	458,638	90,236	213,579	15,055	67,229	19,500	195,000		
1911.....	353,999	406,457	93,205	115,044	27,399	98,018	43,000	372,000	780	\$1,875
1912.....	376,082	481,493	82,757	185,821	53,119	176,056	66,500	481,250		
1913.....	404,801	479,515	103,954	279,395	62,315	208,029	65,100	479,500	200	1,300
1914.....	303,155	368,931	79,083	200,680	81,219	204,033	53,423	382,563		
1915.....	298,864	339,857	74,501	184,929	81,172	190,422	20,278	139,721		

EXPORTS AND IMPORTS.

Statistics of exports and imports of gypsum, as compiled from the Reports of Trade and Navigation, are shown in the accompanying tables. The exports of crude gypsum during the calendar year 1915 were 292,234 tons, valued at \$336,380, or an average of \$1.15 per ton as compared with exports in 1914 of 345,830 tons, valued at \$404,234, or an average of \$1.17 per ton. There were also exports of ground gypsum in 1915 valued at \$80,933, as compared with exports in 1914, valued at \$35,490. The total value of exports of gypsum, both crude and ground, was \$417,313, as compared with exports in 1914, valued at \$439,724.

The imports of gypsum of all grades during the calendar year 1915, reached a value of \$25,819, and included: crude gypsum 1,799 tons, valued at \$7,734, or an average of \$4.30 per ton; ground gypsum 134 tons valued at \$2,253, or an average of \$16.79 per ton (this record appears open to question); and Plaster of Paris 2,441 tons, valued at \$15,832, or an average of \$6.48 per ton.

The imports of gypsum in 1914 were valued at \$75,031, and included: crude gypsum 3,572 tons, valued at \$16,448, or an average of \$4.60 per ton, ground gypsum 536 tons, valued at \$4,301, or an average of \$8.02 per ton and Plaster of Paris 7,739 tons, valued at \$54,282, or an average of \$7.01 per ton.

Exports of Crude Gypsum.

Calendar Year.	NOVA SCOTIA.		NEW BRUNSWICK.		ONTARIO.		TOTAL.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
1874.....	67,830	\$ 68,164	.....	.....	.....	.....	67,830	\$ 68,164
1875.....	86,065	86,193	5,420	\$ 5,420	.....	.....	91,485	91,613
1876.....	87,720	87,590	4,925	6,616	120	\$ 180	92,765	94,386
1877.....	106,950	93,867	5,030	5,030	.....	.....	111,980	98,897
1878.....	88,631	76,695	16,335	16,435	489	675	105,455	93,805
1879.....	95,623	71,353	8,791	8,791	579	720	104,993	80,864
1880.....	125,685	111,833	10,375	10,987	875	1,240	136,935	124,060
1881.....	110,303	100,284	10,310	15,025	657	1,040	121,270	116,349
1882.....	133,426	121,070	15,597	24,581	1,249	1,946	150,272	147,597
1883.....	145,448	132,834	20,242	35,557	462	837	166,152	169,228
1884.....	107,653	100,446	21,800	32,751	688	1,254	130,141	134,451
1885.....	81,887	77,898	15,140	27,730	525	787	97,552	106,415
1886.....	118,985	114,116	23,498	40,559	350	538	142,833	155,213
1887.....	112,557	106,910	19,942	39,295	225	337	132,724	146,542
1888.....	124,818	120,429	20	50	670	910	125,508	121,389
1889.....	146,204	142,850	31,495	50,862	483	692	178,182	194,404
1890.....	145,452	139,707	30,034	52,291	205	256	175,691	192,254
1891.....	143,770	140,438	27,536	41,350	5	7	171,311	181,795
1892.....	162,372	157,463	27,488	43,623	.....	.....	189,860	201,086
1893.....	132,131	122,556	30,061	36,706	.....	.....	162,192	159,262
1894.....	119,569	111,586	40,843	46,538	.....	.....	160,412	158,124
1895.....	133,369	125,651	56,117	67,593	.....	.....	189,486	193,244
1896.....	116,331	109,054	64,946	77,535	.....	.....	181,277	186,589
1897.....	122,984	116,665	66,222	80,485	.....	.....	189,206	197,150
1898.....	99,215	93,474	70,399	81,433	.....	.....	169,614	174,007
1899.....	104,795	99,984	96,831	108,094	*½	12	201,626	208,090
1900.....	.....	.....	.....	.....	.....	.....	188,262	201,912
1901.....	.....	.....	.....	.....	.....	.....	236,247	231,594
1902.....	.....	.....	.....	.....	.....	.....	289,600	295,215
1903.....	.....	.....	.....	.....	.....	.....	287,496	311,580
1904.....	.....	.....	.....	.....	.....	.....	298,211	316,436
1905.....	.....	.....	.....	.....	.....	.....	359,246	388,474
1906.....	.....	.....	.....	.....	.....	.....	404,464	462,814
1907.....	.....	.....	.....	.....	.....	.....	375,026	424,794
1908.....	.....	.....	.....	.....	.....	.....	280,091	324,574
1909.....	.....	.....	.....	.....	.....	.....	315,201	372,286
1910.....	.....	.....	.....	.....	.....	.....	346,081	416,725
1911.....	.....	.....	.....	.....	.....	.....	362,102	425,161
1912.....	.....	.....	.....	.....	.....	.....	364,643	423,208
1913.....	.....	.....	.....	.....	.....	.....	417,302	504,383
1914.....	.....	.....	.....	.....	.....	.....	345,830	404,234
1915.....	.....	.....	.....	.....	.....	.....	292,234	336,380

* Exported from British Columbia.

Exports of Ground Gypsum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value..
1890.....	\$ 105	1898.....	\$ 6,448	1907.....	\$ 557
1891.....	588	1899.....	8,123	1908.....	9,765
1892.....	20,255	1900.....	19,834	1909.....	2,787
1893.....	22,132	1901.....	15,337	1910.....	12,306
1894.....	20,054	1902.....	5,101	1911.....	4,429
1895.....	22,233	1903.....	12,457	1912.....	6,495
1896.....	21,267	1904.....	2,333	1913.....	5,795
1897.....	6,763	1905.....	2,673	1914.....	35,490
		1906.....	2,934	1915.....	80,933

Imports of Gypsum.

Fiscal Year.	CRUDE GYPSUM.		GROUND GYPSUM.		PLASTER OF PARIS.	
	Tons.	Value.	Lbs.	Value.	Lbs.	Value.
1880.....	1,854	\$ 3,203	1,606,578	\$ 5,948	667,676	\$ 2,376
1881.....	1,731	3,442	1,544,714	4,676	574,006	2,864
1882.....	2,132	3,761	759,460	2,576	751,147	4,184
1883.....	1,384	3,001	1,017,905	2,579	1,448,650	7,867
1884.....	.....	3,416	687,432	1,936	782,920	5,226
1885.....	1,353	2,354	461,400	1,177	689,521	4,809
1886.....	1,870	2,429	224,119	675	820,273	5,463
1887.....	1,557	2,492	13,266	73	594,146	4,342
1888.....	1,236	2,193	106,068	558	942,338	6,662
1889.....	1,360	2,472	74,390	372	1,173,996	8,513
1890.....	1,050	1,928	434,400	2,136	693,435	6,004
1891.....	376	640	36,500	215	1,035,605	8,412
1892.....	626	1,182	310,250	2,149	1,166,200	5,595
1893.....	496	1,014	140,830	442	552,130	3,143
1894.....	.....	1,660	23,270	198	422,700	2,386
1895.....	.....	960	20,700	88	259,200	1,619
1896.....	1,045	848	64,500	198	297,000	2,000
1897.....	.....	772	45,000	123	969,900	4,489
1898.....	1,147	1,742	35,700	293	329,600	2,025
1899.....	325	692	33,900	338	496,300	3,120
1900.....	77	958	6,300	69	849,100	6,492
1901.....	286	1,125	65,400	1,097	502,200	3,978
1902.....	541	1,697	56,700	249	475,300	2,641
1903.....	1,076	2,187	68,700	228	630,800	3,599
1904.....	249	663	106,800	559	625,100	2,885
1905.....	2,344	7,386	2,255,700	2,681	7,924,100	37,643
1906.....	6,332	22,008	1,968,600	1,799	12,866,500	43,742
1907 (9 mos.).....	9,189	23,410	609,600	1,619	19,849,400	58,364
1908.....	9,393	36,510	382,500	1,781	15,020,000	51,328
1909.....	10,317	35,268	6,286,200	5,765	17,009,000	64,849
Calendar Year.	.....	.....	.....	.....	.....	.....
1910.....	12,271	21,073	13,380,600	13,242	38,090,300	135,483
1911.....	2,035	11,792	3,362,400	3,619	57,035,700	190,371
1912.....	3,503	16,254	14,144,000	19,651	64,991,600	232,198
1913.....	4,522	21,763	.....	11,770	40,226,400	154,719
1914.....	3,572	16,448	1,072,600	4,301	15,477,500	54,282
1915.....	1,799	7,734	268,500	2,253	4,882,900	15,832

Crude gypsum, duty free. Ground gypsum, duty 15 per cent. Plaster of Paris, duty 12½c per 100 lbs.

The Nova Scotia production, and the larger part of the New Brunswick production as well, is almost all disposed of in the United States market. The large deposits and the excellent facilities for water transportation are responsible for the gypsum being shipped as quarried to grinding and calcining plants outside these provinces.

Returns from Nova Scotia operators show the tonnage of gypsum mined during recent years to have been as follows: 317,076 tons in 1915; 339,747 tons in 1914; 423,977 tons in 1913, and 330,442 tons in 1912. Of the total tonnage mined in 1915 about 86·7 per cent was extracted from quarries in Hants county, near Windsor, Walton, and Cheverie, and the rest came from quarries at Quarry St. Anns, Iona, and McKinnon Harbour, Victoria county.

In New Brunswick four properties were operating, three near Hillsborough in Albert county and the Old Stewart property (Arbuckle quarry) at Plaster Rock re-opened. The tonnage of gypsum mined in 1915 was 78,640 tons, as compared with 86,912 tons in 1914, and 112,739 tons

in 1913. About 72.5 per cent of the output was shipped in crude form, either lump or gound, and the balance was calcined, the latter being marketed in Canada.

In Ontario there was a slight decrease from 1914 in the quantity of gypsum mined, the figures for recent years being as follows: 85,444 tons in 1915, 89,159 tons in 1914, and 71,310 tons in 1913. The total sales in 1915 including crushed, fine ground, and calcined (both that sold as such, and as an ingredient of wall plaster), amounted to 81,172 tons, valued at \$190,422. The total sales of crude, ground and calcined gypsum in 1914 were 81,219 tons, valued at \$204,033.

Manitoba's shipments of gypsum are almost entirely of the calcined grade. In 1914 and 1915 there was a very large falling off in production. The total quantity mined was 24,859 tons, as compared with 64,023 tons in 1914, 76,500 tons in 1913, and 80,000 tons in 1912. The shipments were 20,278 tons, chiefly calcined, valued at \$139,721, as compared with shipments of 53,423 tons, valued at \$382,563 in 1914, and 65,100 tons in 1913, valued at \$479,500.

The following is a list of the principal operators:—

Location.		Operator and Address.
County.	Post Office.	
NOVA SCOTIA.		
Cumberland.....	Nappan.....	Maritime Gypsum Co., Ltd., 381 Fourth Ave., New York.
Hants.....	Minasville.....	Geo. Hamilton, Minasville, N.S.
	Newport Landing.....	Newport Plaster Mining & Manufacturing Co., Ltd., Windsor, N.S. Box 225.
	Walton.....	Rock Plaster Manufacturing Company, 381 Fourth Ave., New York.
	Cheverie.....	Capt. H. B. Patterson, Cheverie, N.S.
	Kempton.....	Noel Plaster Company, Noel, N.S.
	Noel.....	Nova Scotia Gypsum Co., Three Mile Plains, N.S.
	Three Mile Plains.....	Wentworth Gypsum Company, Ltd., Windsor, N.S.
	Wentworth.....	Windsor Gypsum Company, Newburgh, N.Y.
	Newport Station.....	Windsor Plaster Company, Ltd., Windsor, N.S. Box 94.
	Brooklyn.....	
	West Gore.....	
Inverness.....	Eastern Harbour.....	Cheticamp Gypsum and Plaster Co., (St. Lawrence Gypsum Co., Ltd., St. John, N.B.)
Victoria.....	Iona.....	Iona Gypsum Company, Ltd., Sydney, N.S. Box 362.
	Port Hastings.....	Nova Scotia Cement and Plaster Company, 9 Toronto St., Toronto, Ont.
	McKinnon's Harbour..	Newark Plaster Company, 30 Church, New York, N.Y.
	Quarry St. Anns.....	Victoria Gypsum Mg. & Manufacturing Co., Chester, Pa.
	Island Point.....	Plaster Quarry Co., Ltd., c/o 30B, Board of Trade Bldg., Montreal.
NEW BRUNSWICK.		
Albert.....	Hillsborough.....	Albert Manufacturing Company, Hillsborough, N.B.
	Edgetts Landing.....	Hillsboro Plaster Company, Hillsborough, N.B.
		Hillsboro Plaster, Quarrying & Mfg. Co., Ltd., Hillsborough, N.B.
Victoria.....	Plaster Rock.....	Stinson-Reeb Builders Supply Company, 45 Alexander St. Montreal, P.Q.
		John E. Stewart, Andover, N.B.
Westmorland.....	Cape Maringouin.....	New Brunswick Gypsum Company, Ltd., Hillsborough, N.B.
	(Near Rockport).	
ONTARIO.		
Haldimand.....	Caledonia.....	The Alabastine Company, Ltd., Paris, Ont.
	Lythmore.....	The Crown Gypsum Company, Lythmore, Ont.
	Nelles Corners.....	Grand Gypsum Limited, 32 Stinson St., Hamilton, Ont.
MANITOBA.		
Tp. 32. Range 9..	Gypsumville	Manitoba Gypsum Company, Ltd., Winnipeg, Man.
Tp. 33. Ranges 8 and 9.	"	Dominion Gypsum Company, P.O. Box 537, Winnipeg, Man.
BRITISH COLUMBIA.		
	Grand Prairie.....	B. C. Gypsum Company, Yorkshire Bldg., Victoria, B.C.
	Merritt.....	Dr. Geo. Schumacher.

MAGNESITE.

The total shipments of magnesite in 1915, all from Argenteuil county, Quebec, were reported as 14,779 tons, valued at \$126,584. The 1914 shipments were only 358 tons, valued at \$2,240.

The production of magnesite in Canada has been confined to these deposits in Grenville township, Argenteuil county, and previous to 1915 the industry has been of small proportions; in fact, for several years preceding, mining operations had been at a standstill, though shipments had been made from stock.

Calendar Year.	SALES OF MAGNESITE.		IMPORTS OF MAGNESIA.	
	Tons.	Value.	Tons.	Value.
1908.....	120	\$ 840		
1909.....	330	2,508		
1910.....	323	2,160	233	\$10,847
1911.....	991	5,531	253	11,012
1912.....	1,714	9,645	379	29,641
1913.....	515	3,335	145	12,226
1914.....	358	2,240	127	16,429
1915.....	14,779	126,584	91	9,695

The greater part of the world's supply of magnesite has come from Hungary and Greece. The supply from Hungary was of course cut off from most consumers by the outbreak of the European war, with the result that in Canada, as elsewhere, there have been numerous inquiries concerning the possibility of getting requirements filled from local sources. The shortage in the supply in America induced several parties to enter the field as producers. The North American Magnesite (formerly the Canadian Magnesite) Company had, previous to 1915, been the only operator. This Company had on its property a calcining mill and a grinding mill. Shipments from the mine were hauled 12 miles to Calumet on the Canadian Pacific Railway. The crude magnesite has been disposed of to steel mills and to manufacturers of carbon dioxide gas, and the calcined material to sulphite mills and manufacturers of composition flooring.

During 1915 other operators reporting were: the Scottish Canadian Magnesite Co., 58 St. François-Xavier St., Montreal; the Dominion Magnesite Co., Ltd., 149 Broadway, New York; and Messrs. Fitzsimmons and Boshart, 14 Metcalfe St., Ottawa, all operating in Grenville township.

The hydromagnesite deposits occurring in the vicinity of Atlin, B.C., also received some attention during 1915, when Messrs. Armstrong and Morrison of Vancouver, B.C., shipped 615 tons to Vancouver which, how-

ever, were not marketed during the year. In 1916, however, this ore was shipped to a firm in Pennsylvania, the purchasers paying over \$50 per ton therefor, including a freight charge of \$16.87 from Vancouver to Pennsylvania. When ocean freight becomes available via the Panama canal this charge may be reduced to about \$5.00 per ton.

Dr. G. A. Young of the Geological Survey, visited these deposits in 1915 and his report thereon has been published in the Summary Report¹ of the Geological Survey. Dr. Young states: "The influences which have retarded the commercial development of the deposits are, doubtless, their remote situation and the consequent relatively high transportation and working charges which would have to be met. The district is easily accessible, however, by way of the White Pass and Yukon railway from Skagway, Alaska, to Carcross, Yukon Territory, and thence by a bi-weekly boat service on Tagish and Atlin lakes, maintained by the same corporation during the season of navigation. The hydromagnesite deposits are situated close to Atlin, the terminus of the boat service; one group of deposits lying on the southeast border of the town site while the other group occurs on the highway leading to Discovery and is distant only about half a mile from Atlin wharf."

The use of magnesite for refractory products constitutes its most important application in the industries. Made into refractory bricks, it is used as linings for basic steel furnaces. In "dead burnt" calcined form as originally burned, or as brick, the magnesia is used as a refractory lining for open-hearth furnaces and converters in the steel industry, for copper converter linings, for rotary kiln linings in Portland cement manufacture, for furnace hearths, crucibles, cupels, etc. In spite of a prejudice against the presence of lime, silica, oxide of iron, and alumina, analyses of magnesite imported for use in the metallurgical industry in the United States generally show 3 to 4 per cent of silica, 6 to 8 per cent of iron, and 4 per cent of lime. Magnesite also finds extensive use for the manufacture of magnesium bisulphate, used in the pulp and paper industry. To a lesser extent it is used in the manufacture of carbon dioxide gas, as an ingredient of oxy-chloride, or Sorel cement, which is used for composition flooring and interior finishings, as a heat insulating pipe covering, as an adulterant in paint, as a binder for briquetting coal, as a fireproof or fire retarding paint, and in the form of refined magnesia salts for medicinal and toilet purposes.

¹ Summary Report, Geological Survey, of Canada, 1915, pp. 50-61.

MANGANESE.

The demand for manganese ores in 1915 occasioned by the cutting off or restriction of imports from Russia and India resulted in some attention being paid to Canadian sources.

Total shipments during the year were reported as 201 tons, valued at \$9,360, which included 51 tons, valued at \$5,760 from Nova Scotia, and 150 tons, valued at \$3,600 from New Brunswick.

Exports as reported by the Customs Department were 255 tons, valued at \$6,855.

Annual Production of Manganese Ore.

Calendar Year.	Tons.	Value.	Value per ton.	Calendar Year.	Tons.	Value.	Value per ton.
1886.....	1,789	\$41,499	\$23.20	1901*.....	440	\$ 4,820	\$ 10.95
1887.....	1,245	43,658	35.07	1902*.....	172	4,062	23.62
1888.....	1,801	47,944	26.62	1903.....	91	2,775	30.49
1889.....	1,455	32,737	22.50	1904.....	66	2,740	41.51
1890.....	1,328	32,550	24.51	1905*.....	22	1,720	78.18
1891.....	255	6,694	26.25	1906*.....	93	925	9.95
1892.....	115	10,250	89.13	1907*.....	1	22	22.00
1893.....	213	14,578	68.44	1908.....	Nil.	.....	.....
1894.....	74	4,180	56.49	1909.....	Nil.	.....	.....
1895.....	125	8,464	67.71	1910.....	Nil.	.....	.....
1896*.....	123½	3,975	32.19	1911.....	5½	300	54.55
1897*.....	15½	1,166	76.46	1912.....	75	1,875	25.00
1898.....	50	1,600	32.00	1913.....	Nil.	Nil.	.....
1899.....	1,581	20,004	12.65	1914.....	28	1,120	40.00
1900.....	30	1,800	60.00	1915.....	201	9,360	46.57

*Exports.

The mining of manganese ores in Canada reached considerable proportions between 1880 and 1890 when the annual production ranged from 1,200 to 1,800 tons, valued at from \$30,000 to \$50,000. In 1891 the production fell away, and only once since (in 1899) did it exceed 500 tons. In 1907, 1908, 1909, and 1910, there was no production. In 1910 the Nova Scotia Manganese Company started operations on a property at New Ross, Lunenburg county, N.S., and since then they have made small shipments in 1911, 1912, and 1914.

The property was taken over in September, 1915, by the Metals Development Company, Ltd., of 80 Granville St., Halifax. The ore is reported to be a mixture of psilomelane and manganite. The operators are equipped to crush and screen the ore to any size desired.

W. M. McDonald, of Sydney, C.B., opened up on a small scale the "Glenmore" and "Isabella" Manganese properties at Enon near Loch Lomond, Cape Breton county.

Bog manganese deposits in the vicinity of Adamsville Station, on the Intercolonial Railway in Kent county, New Brunswick were mined during 1915 by the New Brunswick and Nova Scotia Mining and Development Co., of 60 Broadway, New York. The ore, which as mined contained from 60 to 70 per cent moisture and vegetation, was dried and calcined before shipment. Although the operations were largely experimental, about 150 tons of calcined ore were shipped to New York.

The following description¹ of the occurrence of the ore is from a report by John C. Sparks, chemist of 30 Church St., New York: "Manganese is present in the form of wad, an amorphous, non-metallic, earthy ore, commonly known as bog manganese, consisting of manganese dioxide mechanically mixed with oxide of iron, silica and decayed peaty vegetable matter."

"In every case the deposit of manganese was situated at and around a spring, the manganese evidently being in solution in the spring and becoming oxidised and thrown into suspension on contact with air as the water passes out of the spring. In a large number of the deposits the springs, on account of the precipitating action mentioned above, were elevated at a height of about two to five feet above the surrounding ground, giving a heavy deposit of relatively pure material immediately surrounding the spring and a thinner deposit of manganese ore, containing a high quantity of peat in portions removed from the spring."

"All of the deposits were shallow varying usually from one to three feet in thickness and were underlaid either by a hard white sand or a grey clay."

Exports of Manganese Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value
1873.....	1,031	\$20,192	1894.....	56	\$3,120
1874.....	782	16,973	1895.....	108.3	6,351
1875.....	203	5,514	1896.....	123.5	3,975
1876.....	412	8,039	1897.....	15.3	1,166
1877.....	891	15,909	1898.....	11	325
1878.....	626	10,860	1899.....	70	2,410
1879.....	1,886	27,436	1900.....	34	1,720
1880.....	2,179	34,797	1901.....	440	4,820
1881.....	1,704	40,554	1902.....	172	4,062
1882.....	894	25,747	1903.....	135	1,889
1883.....	1,326	25,343	1904.....	123	2,706
1884.....	603	20,089	1905.....	22	1,720
1885.....	1,684	34,649	1906.....	93	925
1886.....	(a) 1,818	58,338	1907.....	1	22
1887.....	1,415	34,802	1908.....	.....	.....
1888.....	1,181	21,832	1909.....	3	434
1889.....	1,436	29,350	1910.....	4	160
1890.....	1,906	36,831	1911.....	4	225
1891.....	255	6,694	1912.....	10	300
1892.....	143	8,205	1913.....	8	303
1893.....	133	12,521	1914.....	30	750
			1915.....	255	6,855

(a) 250 tons from Cornwallis should more correctly be classed under the heading of mineral pigments.

¹ Annual Report of the Crown Land Department, New Brunswick, 1915, p. XXI.

No separate record of imports of manganese ores is kept in the classification of the Customs Department, but statistics for imports of "oxide of manganese" are listed. In 1915 these imports were 1,238 tons, valued at \$46,678, or an average of \$37.70 per ton, as compared with 1,702 tons, valued at \$42,287, or an average of \$24.85 per ton in 1914, and 2,588 tons in 1913, valued at \$46,990, or an average value of \$18.16 per ton. Imports of ferro-silicon, spiegeleisen, and ferro-manganese for 1915 were 13,758 tons, valued at \$807,312; 22,147 tons valued at \$549,485 in 1914, and 30,355 tons in 1913, valued at \$940,443.

Statistics of imports of oxide of manganese follow:—

Imports of Oxide of Manganese.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1884.....	3,989	\$ 258	1900.....	126,725	\$ 4,155
1885.....	36,778	1,794	1901.....	272,134	8,176
1886.....	44,967	1,753	1902.....	476,331	5,360
1887.....	59,655	2,933	1903.....	279,611	8,051
1888.....	65,014	3,022	1904.....	275,696	7,051
1889.....	52,241	2,182	1905.....	235,289	6,832
1890.....	67,452	3,192	1906.....	244,620	5,508
1891.....	92,087	3,743	1907 (9 mos.).....	386,404	11,087
1892.....	76,097	3,530	1908.....	732,242	17,863
1893.....	94,116	3,696	1909.....	382,137	6,561
1894.....	101,863	4,522	Calendar Year.		
1895.....	64,151	2,781	1910.....	1,297,020	17,133
1896.....	108,590	4,075	1911.....	1,924,520	22,612
1897.....	70,663	2,741	1912.....	2,512,610	27,707
1898.....	130,456	5,047	1913.....	5,175,195	46,990
1899.....	141,356	5,539	1914.....	3,404,863	42,287
			1915.....	2,476,328	46,678

The manganese ores which have been mined in Canada are pyrolusite, manganite, psilomelane, and bog manganese. These were mostly ores with a high manganese content, and fairly free from deleterious constituents. The largest part of the production was consequently put to those uses where a high grade raw material is desired, *e.g.*, as an oxidizing agent in the manufacture of chlorine, bromine, manganates, and permanganates, as a decolorizer of glass, porcelain, and enamels, as a colouring material in dyeing and pottery and paint manufacture, as a drier in paints and varnishes, in the manufacture of dry and Leclanche cells, etc.

By far the greater part of the world's production of manganese, though, enters the market as spiegeleisen, and ferro-manganese. These are used principally in the steel industry where they are added to both Bessemer and open-hearth steels, the manganese acting as a deoxidizer, recarbonizer, and neutralizer of sulphur.

Over 50 per cent of the world's annual production of manganese ore has been coming from Russian territory in the vicinity of the Black sea, and a large share from British India. Because of the supply coming from the sources mentioned and because during the early days of the European war, the exportation of manganese from British ports to destinations other than those within the British Empire, or in France or Russia, was prohibited, the ferro-manganese market during the closing months of 1914 was in a most disturbed condition. In this country the difficulty experienced by manufacturers of steel products in securing their requirements has led to considerable inquiry as to the possibility of securing manganese from Canadian sources. In 1915 the imports of manganese ore into the United States were 313,985 tons, as against 283,294 tons in 1914, the falling in imports from Russia and India being more than compensated by the greatly increased imports from Brazil. Considerable difficulty however, was experienced in securing adequate supplies of ore containing from 85 to 92 per cent manganese dioxide and particularly required in the manufacture of dry batteries and flint glass.

MICA.

According to returns received from producers, shipments of mica in 1915 totalled 417 tons, valued at \$91,905, or an average of \$220.40 per ton, as compared with shipments in 1914, of 595 tons, valued at \$109,061, or an average of \$183.30 per ton. By provinces, the production was: Quebec 217 tons, valued at \$50,390, or an average of \$232.21 per ton, and Ontario 200 tons, valued at \$41,515, or an average of \$207.58 per ton.

The statistics as to value of production should be considered with discretion and with due regard to the conditions under which the industry is conducted. The condition in which mica is shipped from the mines varies greatly: one operator ships his output cleaned and trimmed, while the output of another is in a rough cobbled state, with consequent noteworthy differences in prices realized. And further, companies operating trimming shops as well as mines may place only a nominal value on shipments from mines to trimming shops.

Tables showing the annual production by provinces during recent years, and the total value of the annual production from 1886 to 1908 follow:—

Annual Production of Mica by Provinces.

Calendar Year.	QUEBEC.			ONTARIO.			TOTAL.		
	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
1909...	128	\$ 93,298	\$728.89	241	\$ 54,484	\$226.07	369	\$147,782	\$400.49
1910...	316	87,295	276.25	442	103,090	233.24	758	190,385	251.17
1911...	217	69,465	320.12	373	59,212	158.75	590	128,677	218.10
1912...	196	81,044	413.48	384	62,932	163.89	580	143,976	248.23
1913...	626	125,488	200.46	478	68,816	143.97	1,104	194,304	176.00
1914...	246	62,794	255.26	349	46,267	132.57	595	109,061	183.30
1915...	217	50,390	232.21	200	41,515	207.58	417	91,905	220.40

Annual Production of Mica, 1886-1908.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1886.....	\$ 29,008	1894.....	\$ 45,581	1902.....	\$135,904
1887.....	29,816	1895.....	65,000	1903.....	177,857
1888.....	30,207	1896.....	60,000	1904.....	160,777
1889.....	28,718	1897.....	76,000	1905.....	178,235
1890.....	68,074	1898.....	118,375	1906.....	303,913
1891.....	71,510	1899.....	163,000	1907.....	312,599
1892.....	104,745	1900.....	166,000	1908.....	139,871
1893.....	75,719	1901.....	160,000		

Most of the various minerals of the mica group have been found in Canada. Lepidolite occurrences have been noted in British Columbia, Nova Scotia, and Quebec; biotite occurrences in Ontario and Quebec; muscovite occurrences in British Columbia, Manitoba, Nova Scotia, Ontario, and Quebec; and phlogopite occurrences in Baffinland, Ontario, and Quebec. Only the phlogopite (or amber mica) occurrences of Ontario and Quebec have been proven to be of economic interest. These have been the subject of special investigation by the Mines Branch, Ottawa.¹ The muscovite occurrences at Tete Jaune Cache, and Big Bend in British Columbia have also been specially investigated by the Mines Branch² but as yet they have made no production.

Canada's production of mica has come exclusively from two fields: one, in the Province of Quebec, a short distance to the north of the city of Ottawa, and the other embracing parts of the counties of Lanark, Leeds, and Frontenac, in the Province of Ontario. The city of Ottawa (and the adjacent city of Hull) lying between these two fields is the centre to which almost all the production of the various mines and numerous small prospects is shipped for trimming, grading, and marketing. In preparation for the market a considerable proportion of the tonnage received is cobbled out, with the result that the exports, though of smaller tonnage than the shipments from the mines, usually exceed them in total value because of being of much higher grade.

According to Customs records the exports of mica in 1915 were 440 tons, valued at \$236,124, of which 67 tons, valued at \$34,065 were exported to Great Britain; 372 tons, valued at \$201,659 to the United States; and 1 ton, valued at \$400 to other countries. In 1914 the total exports were 335 tons, valued at \$178,940, of which 70 tons, valued at \$37,969 were to Great Britain; 242 tons, valued at \$126,220 to the United States; and 23 tons, valued at \$14,751 to other countries.

Tables showing the annual exports and the distribution of the exports by countries during recent years follow:—

Annual Exports of Mica.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Tons.	Value.
1887.....	\$ 3,480	1897.....	\$ 69,101	1906.....	912	\$581,919
1888.....	23,563	1898.....	110,507	1907.....	558	422,172
1889.....	30,597	1899.....	158,002	1908.....	290	198,839
1890.....	22,468	1900.....	146,750	1909.....	359	256,834
1891.....	37,590	1901.....	152,553	1910.....	469	330,903
1892.....	86,562	1902.....	391,812	1911.....	347	242,548
1893.....	70,081	1903.....	196,020	1912.....	448	334,054
1894.....	38,971	1904.....	198,482	1913.....	409	240,775
1895.....	48,525	1905.....	179,049	1914.....	335	178,940
1896.....	47,756			1915.....	440	236,124

¹ "Mica: Its Occurrence, Exploitation and Uses." H. S. deSchmid, Mines Branch, Dept. of Mines, Ottawa, No. 118.

² Mines Branch, Dept. of Mines, Ottawa, Summary Report, 1913, p. 42.

Exports of Mica by Countries, 1913, 1914, and 1915.

	1913.		1914.		1915.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
To Great Britain.....	71	\$ 33,273	70	\$ 37,969	67	\$ 34,065
To United States.....	333	202,155	242	126,220	372	201,659
To other countries.....	5	5,347	23	14,751	1	400
Total.....	409	240,775	335	178,940	440	236,124

Statistics of the imports of mica into the United States, and Great Britain, showing the relative importance of Canada as a source of supply for each, are given in the following tables:—

Imports of Mica into the United States¹.

Year ending June 30.	IMPORTS FROM CANADA.		TOTAL IMPORTS FROM ALL COUNTRIES.	
	Short tons.	Value.	Short tons.	Value.
1895.....	273	\$ 39,637	410	\$ 127,515
1896.....	310	57,908	632	214,997
1897.....	208	54,630	441	187,845
1898.....	233	53,854	313	94,294
1899.....	512	131,310	808	259,228
1900.....	549	136,981	1,019	314,882
1901.....	484	161,741	1,011	369,644
1902.....	427	184,287	903	384,818
1903.....	417	196,470	973	414,953
1904.....	287	137,191	693	306,937
1905.....	253	121,560	594	296,362
1906.....	539	328,991	1,206	731,484
1907.....	767	596,321	1,724	1,295,606
1908.....	172	140,166	655	567,550
1909.....	167	132,941	403	313,525
1910.....	434	333,196	1,008	682,539
1911.....	316	239,964	872	612,936
1912.....	362	213,750	742	513,792
1913.....	639	218,365	1,634	1,003,158
1914.....	340	124,785	806	524,454
1915.....	254	69,481	382	221,704

¹ The Foreign Commerce and Navigation of the United States.

Imports of Mica into Great Britain.*

	1913.		1914.		1915.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Germany.....	109,312	\$ 16,751	69,552	\$ 14,220	487,760	\$ 17,885
United States.....	99,568	4,983	206,640	12,395	113,568	37,872
Other foreign countries.....	144,032	14,240	54,768	30,947	3,307,808	448,313
British India.....	4,499,936	700,123	2,745,008	460,392	208,768	29,497
Canada.....	154,896	43,591	137,200	37,040	82,656	11,636
Other British possessions.....	35,392	9,607	38,080	5,787		
Total.....	5,043,136	789,295	3,251,248	560,781	4,200,560	545,203

* British Trade Report.

The following is a list of the operators of mica mines who have sent in returns to the Statistical Division of the Mines Branch in 1914 and 1915.

Operator and Address.	Location of Mine.	
	County.	Township and Lot.
<i>Ontario.</i>		
John H. Adams & Co., Perth, Ont.....	Lanark	N. Burgess, Tully lots
Dom. Improvement & Development Co., P.O. Box 26, Perth, Ont.	"	" V 3, 9, 15.
Smith & Sewell, Stanleyville, Ont., R.R. No. 3.....	"	" VII 9.
W. L. McLaren, Nevis Cottage, Perth, Ont.....	"	" VI E $\frac{1}{2}$ 13.
Kingston & Perth Mining Co., Kingston.....	"	" IX 4.
Kent Bros., Kingston, Ont.....	"	" VII 24.
	"	" VIII W $\frac{1}{2}$ 2,
	"	" E $\frac{1}{2}$ 3.
Jas. Richardson & Sons, Kingston, Ont.....	"	" V W $\frac{1}{2}$ 13.
Loughboro Mining Company, Schenectady, N.Y.....	Frontenac.....	Loughborough X W $\frac{1}{2}$ 1.
Frontenac Mica Company, Sydenham, Ont.....	"	" VII W $\frac{1}{2}$ 11.
The Birch Lake Mining Company, 115 York, Ottawa, Ont.	"	" VIII N $\frac{1}{2}$ 10.
J. W. Trousdale, Sydenham, Ont.....	"	" IX 6; X S $\frac{1}{2}$ 6
S. H. Orser, Perth Road, Ont.....	"	" X 8.
J. P. Tett & Bro., Bedford Mills, Ont.....	"	" VIII 12, 13.
Kent Bros. & J. Stoness, Kingston, Ont.....	"	Bedford VIII 4.
Anglin Mica Company, Ltd., Kingston, Ont.....	"	" IV 12; VI 30.
	"	" Devils Lake.
<i>Quebec.</i>		
William Argall, Laurel, Que.....	Argenteuil.....	Harrington, IV 9.
J. B. Gorman, Buckingham, Que.....	Labelle.....	Wentworth, X 19a, 19b
J. B. Gauthier, Buckingham, Que.....	"	Lochaber XIII 19.
H. T. Flynn, Hull, Que., 108 Montcalm.....	"	Buckingham, IV 21.
W. L. Parker, Buckingham, Que.....	"	Villeneuve, II W $\frac{1}{2}$ 2.
Richard & Company, L'Ange Gardien, Que.....	"	Derry II 31, etc.
Wm. Cleland, Bouchette, Que.....	Ottawa.....	" I 5.
Laurentide Mica Co., Ltd., Pittsburgh, Pa., Box 911.....	Montmorency...	Portland East 1a.
The Capital Mica Co., Ltd., Ottawa.....	Ottawa.....	Petit Pre (Post Office).
O'Brien & Fowler, Ottawa.....	"	Cameron II 10.
	"	Hull VII 18, 19; XI 16b.
	"	Templeton IX 15a, 15b.
	"	Wakefield II 23a.
	"	Portland East, I 6, 7;
	"	" X 31, 32.
	"	Templeton IV 1; XII 4.
	"	Villeneuve I 30, 31; IV 1.
Brown Bros., Cantley, Que.....	"	Hull VI 20; XII 11b.
Vavasour Mining Assoc., Ottawa, 22 Metcalfe.....	"	" XII 10.
J. A. Wilson, Cantley, Que.....	"	" XVI 13.
Kellar Bros., Cascades, Que.....	"	" XV 25.
Webster & Company, Ottawa, 274 Stewart.....	"	Portland West X 2, 4, 5.
Jno. Burns, Buckingham, Que.....	"	Templeton VIII 16, 17;
Progressive Mining Co., Ltd., Ottawa, 124 Rideau.....	"	" XIII 4, 5.
Wallingford Mica & Mining Co., Ottawa.....	"	Gore, Lot 8.
Wallingford Bros., Ltd., Ottawa.....	"	Portland East, XI 9, 10.
Blackburn Bros., Ottawa, 134 Wellington.....	"	Wakefield, II 17.
Jos. Morris, Wilsons Corners, Que.....	"	" VI 2, 6, 27.
R. J. McGlashan, Wilsons Corners, Que.....	Pontiac.....	Thorne (P.O. Schwartz).
Cross & Wilson, Cascades, Que.....	"	" (P. O. Ladysmith).
Geo. Nesbitt, Wakefield, Que.....	"	

MINERAL PIGMENTS.

Ochres.

In 1915 the total production of ochres and iron oxides (used for other purposes than the recovery from them of their metallic contents), was 6,248 tons, valued at \$48,353, as compared with a production in 1914 of 5,890 tons, valued at \$51,725, and in 1913 of 5,987 tons, valued at \$41,774.

The 1915 production included 1,900 tons of ochres, valued at \$37,441, or an average of \$19.71 per ton, used for paint manufacture and 4,348 tons, valued at \$10,912, shipped to gas works, while the 1914 production included 2,140 tons of ochres, valued at \$44,225, or an average of \$20.67 per ton, used for paint manufacture, and 3,750 tons, valued at \$7,500, shipped to gas works.

The ochres used in paint manufacture are calcined, washed, and fine ground at the point of production, while that used for the purification of illuminating gas is shipped in crude form to gas companies.

Statistics of production since 1886 are shown in the following table:—

Annual Production of Ochres and Iron Oxides.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886.....	350	\$ 2,350	1901.....	2,233	\$16,735
1887.....	485	3,733	1902.....	4,955	30,495
1888.....	397	7,900	1903.....	6,266	32,760
1889.....	794	15,280	1904.....	3,925	24,995
1890.....	275	5,125	1905.....	5,105	34,675
1891.....	900	17,750	1906.....	6,758	36,125
1892.....	390	5,800	1907.....	5,828	35,570
1893.....	1,070	17,710	1908.....	4,746	30,440
1894.....	611	8,690	1909.....	3,940	28,093
1895.....	1,339	14,600	1910.....	4,813	33,185
1896.....	2,362	16,045	1911.....	3,622	28,333
1897.....	3,905	23,560	1912.....	7,654	32,410
1898.....	2,226	17,450	1913.....	5,987	41,774
1899.....	3,919	20,000	1914.....	5,890	51,725
1900.....	1,966	15,398	1915.....	6,248	48,353

The working of ochre deposits in Canada has been chiefly confined to those deposits found between Champlain and Three Rivers, in the Province of Quebec, a short distance from the shore of the St. Lawrence river. In 1912 there was a small production from a deposit at St. Joseph de Nicolet, Quebec, but it has not since been operated.

In Ontario there have been a few small outputs from an ochre deposit at Campbellville, Halton county, but it has not been operated since 1911.

The only active operators in the ochre industry in 1915 were the following:—

The Canada Paint Company, Limited, Montreal, Que.
 The Champlain Oxide Company, Three Rivers, Que.
 Thos. H. Argall, Three Rivers, Que.

In previous years production was reported by:—

Francois Ouellette, St. Joseph de Nicolet, Que.
 Ontario Mineral Paint Company, Campbellville, Ont.

The exports of iron oxide, or mineral pigments in 1915 are reported as 1,196 tons, valued at \$17,263, as compared with 1,777 tons in 1914, valued at \$22,311, and 1,956 tons in 1913, valued at \$18,931. Statistics of exports from 1897 follow:—

Exports of Mineral Pigments, Iron Oxides, etc.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1897.....	512	\$ 7,706	1906.....	139	\$ 2,379
1898.....	283	4,227	1907.....	191	10,043
1899.....	308	5,408	1908.....	125	4,850
1900.....	651	7,154	1909.....	658	7,956
1901.....	401	8,233	1910.....	1,746	29,839
1902.....	352	6,182	1911.....	2,000	27,070
1903.....	676	12,770	1912.....	3,016	34,513
1904.....	416	7,260	1913.....	1,956	18,931
1905.....	353	7,704	1914.....	1,777	22,311
			1915.....	1,196	17,263

Imports of mineral pigments are entered under two classifications: (1) ochres and ochrey earth, and raw siennas, duty 20 per cent, and (2) oxides, dry fillers, fireproofs, umbers and burnt siennas, n.e.s., duty 25 per cent.

During 1915 imports under the first classification were 1,240 tons, valued at \$23,763, and under the second 2,452 tons, valued at \$260,986, or a total of 3,692 tons, valued at \$284,749. For 1914, imports under the first classification were 1,532 tons, valued at \$33,197, and under the second 4,023 tons, valued at \$244,867, or a total of 5,555 tons, valued at \$278,064.

Statistics of imports appear in the following tables:—

Imports of Ochres and Pigments, 1914 and 1915.

	Duty.	1914.		1915.	
		Pounds.	Value	Pounds.	Value
Ochres and ochrey earths and raw siennas.....	20%	3,064,776	\$ 33,197	2,479,853	\$ 23,763
Oxides, dry fillers, fireproofs, umbers and burnt siennas n.e.s.	25%	8,045,721	244,867	4,904,725	260,986
Total.....		11,110,497	278,064	7,384,578	284,749

Annual Imports of Ochres and Pigments.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds	Value.
1880.....	571,454	\$ 6,544	1898.....	2,126,592	\$ 26,307
1881.....	677,115	8,972	1899.....	2,444,698	31,092
1882.....	731,526	8,202	1900.....	2,474,537	32,017
1883.....	898,376	10,375	1901.....	2,092,067	27,267
1884.....	533,416	6,398	1902.....	2,530,743	33,909
1885.....	1,119,177	12,782	1903.....	3,215,346	42,243
1886.....	1,100,243	12,267	1904.....	2,767,580	36,636
1887.....	1,460,128	17,067	1905.....	3,122,690	35,887
1888.....	1,725,460	17,664	1906.....	4,321,530	57,397
1889.....	1,342,783	12,994	1907 (9 mos.).....	2,926,528	39,675
1890.....	1,394,811	14,066	1908.....	3,749,132	39,923
1891.....	1,528,696	20,550	1909.....	2,122,781	27,540
1892.....	1,708,645	22,908	Calendar Year.		
1893.....	1,968,645	23,134	1910.....	4,227,660	55,393
1894.....	1,358,326	18,951	1911.....	4,397,514	53,092
1895.....	793,258	12,048	1912.....	4,998,089	69,621
1896.....	1,159,494	16,954	1913.....	12,100,014	283,554
1897.....	1,504,044	18,504	1914.....	11,110,497	278,064
			1915.....	7,384,578	284,749

MINERAL WATER.

The statistics of production given herewith represent, as usual, as closely as can be secured, the value of mineral water shipped from mineral springs in bottles, barrels, or other containers, and do not include any estimate of the value of mineral water used at springs for drinking or bathing purposes; nor are the natural pure spring waters included, of which a considerable quantity is sold in bottled form.

The value of the production in 1915 was \$115,274 as compared with \$134,111 in 1914, \$173,677 in 1913, and \$172,465 in 1912.

The imports of mineral and aerated waters during the calendar year 1915 were valued at \$126,569; during 1914, at \$199,327; during 1913, \$257,153; and during 1912, at \$273,698.

The exports of mineral water during 1915 were valued at \$3,578, as compared with \$2,367 in 1914, and \$1,496 in 1913.

Statistics of production, imports and exports, are given in the following tables:—

Annual Production of Mineral Water.

Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.	Calendar Year.	Gals.	Value.
1888.....	124,850	\$ 11,456	1897.....	749,691	\$141,477	1906.....		\$100,000
1889.....	424,600	37,360	1898.....	555,000	100,000	1907.....		136,020
1890.....	561,165	66,031	1899.....		100,000	1908.....		151,953
1891.....	427,485	54,268	1900.....		75,000	1909.....		175,173
1892.....	640,380	75,348	1901.....		100,000	1910.....		199,563
1893.....	725,096	108,347	1902.....		100,000	1911.....		223,758
1894.....	767,460	110,040	1903.....		100,000	1912.....		172,465
1895.....	739,382	126,048	1904.....		100,000	1913.....		173,677
1896.....	706,372	111,736	1905.....		100,000	1914.....		134,111
						1915.....		115,274

Annual Imports of Mineral Water.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880.....	\$41,797	1892.....	\$ 17,913	1904.....	\$137,304
1881.....	55,763	1893.....	27,909	1905.....	161,799
1882.....	57,953	1894.....	28,130	1906.....	178,643
1883.....	49,546	1895.....	27,879	1907 (9 months).....	143,16
1884.....	48,613	1896.....	32,674	1908.....	153,831
1885.....	55,864	1897.....	22,142	1909.....	159,221
1886.....	47,006	1898.....	33,314	Calendar Year.	
1887.....	52,989	1899.....	38,046	1910.....	202,306
1888.....	54,891	1900.....	30,343	1911.....	229,367
1889.....	66,331	1901.....	40,802	1912.....	273,698
1890.....	71,521	1902.....	91,871	1913.....	257,153
1891.....	15,721	1903.....	108,130	1914.....	199,327
				1915.....	126,569

Annual Exports of Mineral Water.

Calendar Year.	Gallons.	Value.	In bottles. Value.	Total.
1910.....	16,136	\$ 7,169		\$ 7,169
1911.....	26,495	12,952		12,952
1912.....	9,690	4,710		4,710
1913.....	3,640	526	\$ 970	1,496
1914.....	2,287	599	1,768	2,367
1915.....	198	53	3,525	3,578

The following is a list of the principal producers of mineral water:—

Operator.	Address.	Location of Spring.		Brand of Water.
		County.	P.O.	
Havelock Mineral Springs Company, Ltd.	Moncton, N.B.....	Kings, N.B.....	Havelock.....	
Radnor Water Company, Ltd.	Montreal, 500 McGill Bldg.	Champlain, Que....	Radnor Forges	Radnor.
Cyprien Roy.....	St. Germain, Que....	Kamouraska, Que..	L'Islet—Plate.	St. Germain
*St. Leon Waters, Limited.....	Toronto, 1 Toronto St.	Maskinonge, Que....	St. Leon.....	Mirack.
Ratté et Frère.....	Quebec, 22 Bigouette	"	Nancy.....	St. Leon.
*Chas. Gurd & Co., Ltd.....	Montreal, 76 Bleury	Vercheres, Que.....	Varennes.....	Varennes.
The Abenakis Springs Co., Ltd.	Abenakis Springs, Que.	Yamaska, Que.....	Abenakis Springs.	Abenakis.
M. Timmons & Son.....	Quebec, Que.....	Quebec, Que.....	Quebec.....	Claire Fontaine.
Saugeen Mineral Water Company.	Southampton, Ont...	Bruce, Ont.....	Southampton.	Saugeen.
The Carlsbad, Ltd.....	Carlsbad Springs, Ont	Carleton, Ont.....	C. Springs....	Carlsbad.
Borthwick Mineral Water Co...	Ottawa.....	"	"	Borthwick.
Goderich Mineral Water Co...	Goderich, Ont.....	Huron, Ont.....	"	Minisitung.
Dom. Springs Mineral Water..	Pakenham, Ont. R.R. No. 4.	Lanark, Ont.....	"	Dominion.
Sanitaris Limited.....	Arnprior, Ont.....	N. ".....	Pakenham....	Sanitaris.
Arthur Bélanger.....	Papineauville, Que...	Prescott, Ont.....	N.Plantaganet Tp.	St. George.
Allan's Limited.....	Montreal, 86 Dorchester W.	"	Caledonia Springs	Caledonia.
Chas. Gurd & Co., Ltd.....	Montreal, 76 Bleury	"	"	Gurd's Caledonia.
Lyall, Trenholme & Macdonnell	Montreal West.....	"	"	Beaver.
A. Sabourin.....	Hawkesbury.....	"	"	Maple Leaf.
The Caledonia Springs Co., Ltd.	Montreal, 360 Craig E.	"	"	Magi.
F. Deneault.....	Bourget, Que.....	{ Russell, Ont.....	Bourget.....	Adanac.
*The Can. Mineral Waters, Ltd.	Toronto, 65 Bellwood Ave.	"	"	Brook.
*Stanley Mineral Springs Co., Ltd.	Winnipeg.....	"	"	Russell.
		Thunder Bay Dist., Ont.	Stanley.....	Lithia.
				Stanley.
Halcyon Bottling Co.....	Halcyon, B.C.....	W. Kootenay Dist...	Halcyon.....	Halcyon.
M. Grady.....	St. Leon Hot Springs, B.C.	" " ..	St. Leon, Hot Springs.	Lithia.
F. F. Siemens.....	Rush Lake, Sask...	" " ..	Renata, B.C..	St. Leon.

*Idle

NATURAL GAS.

The total production of natural gas in Canada in 1915 was 20,124,162 thousand cubic feet, valued at \$3,706,035, to which Ontario contributed 15,211,523 thousand cubic feet valued at \$2,622,838 (as reported to the Ontario Bureau of Mines; direct returns by operators to the Mines Branch were not complete); Alberta, 4,481,947 thousand cubic feet, valued at \$1,022,814; and New Brunswick, 430,692 thousand cubic feet, valued at \$60,383.

The total production in 1914 was 21,692,504 thousand cubic feet, valued at \$3,484,727, to which the provinces contributed as follows: Ontario, 14,094,521 thousand cubic feet, valued at \$2,215,808; Alberta, 7,172,157 thousand cubic feet, valued at \$1,214,670; and New Brunswick, 425,826 thousand cubic feet, valued at \$54,249.

The value of the gas, as reported by the producers, varies from 5 cents to 30 cents per thousand feet, but these prices do not represent what the consumer has to pay. In some cases the producer also owns the distribution pipe line and receives the full price paid by the consumer. In other cases the producer may sell to a pipe line company who either sells directly to consumers, or may in turn re-sell to other pipe line companies for retail distribution; in such cases as these the producer receives only a fraction of the amount paid by the consumer, but he is saved the expense of distribution. The statistics given herewith represent, as far as possible, the value received by the producer, or owner, of the gas wells, whether such producer be the owner of the distribution line or not.

The petroleum and natural gas resources of Canada have been the subject of special investigation by the Mines Branch, Ottawa, and two volumes comprising the results of this investigation have recently been issued.¹

Statistics of the production of natural gas in 1913, 1914, and 1915, and of the value of the annual production since 1892 follow:—

Natural Gas Production, 1915.

Province.	No. men.	Wages.	No. WELLS, 1915.				PRODUCTION.		
			(a)	(b)	(c)	(d)	M cub. ft.	Value.	Average.
New Brunswick.....	8	8,413	22	0	0	0	430,692	\$ 60,383	\$0.13‡
Ontario††.....							15,211,523	2,622,838	0.17
Saskatchewan.....			0	0	0	1			
Alberta.....	177	242,173	63	1	1	1	4,481,947	1,022,814	0.23
Total.....							20,124,162	3,706,035	0.18

(a) Total number of producing wells at end of year.

(b) Number of producing wells drilled during the year.

(c) Number of non-producing wells drilled during the year.

(d) Number of incomplete wells at the end of the year.

†† Figures from Ontario Bureau of Mines.

¹ "Petroleum and Natural Gas Resources of Canada," F. G. Clapp, Mines Branch, Department of Mines. Can., No. 291, Vol. I and Vol. II.

Natural Gas Production, 1914.

Province.	No. men.	Wages.	No. WELLS, 1914.				PRODUCTION.		
			(a)	(b)	(c)	(d)	M cub. ft.	Value.	Average.
Quebec.....			2	1	0	0			
New Brunswick.....	5	5,825	23	2	3	0	425,826	\$ 54,249	\$ 0.13
Ontario.....	392	224,492	1,665	120	28	2	14,094,521	2,215,808	0.15½
Saskatchewan.....			0	1	1	3			
Alberta.....	164	243,976	64	10	1	4	7,172,157	1,214,670	0.17
British Columbia.....			0	0	0	1			
Total.....	561	474,293	1,754	134	33	10	21,692,504	3,484,727	0.16

- (a) Total number of producing wells at end of year.
 (b) Number of producing wells drilled during the year.
 (c) Number of non-producing wells drilled during the year.
 (d) Number of incomplete wells at end of the year.

Natural Gas Production, 1913.

Province.	No. men.	Wages.	No. WELLS, 1913.				PRODUCTION.		
			(a)	(b)	(c)	(d)	M cub. ft.	Value.	Average
New Brunswick.....	35	35,000	31	6	6	3	828,603	\$ 174,147	\$ 0.21
Ontario.....	336	237,600	*1,605	211	49	14	12,474,745	2,055,768	0.16½
Saskatchewan.....			1			2			
Alberta.....	176	341,825	49	20	3	3	7,174,490	1,079,466	0.15
British Columbia.....			0	0	0	2			
Total.....	547	614,425	*1,686	237	58	24	20,477,838	3,309,381	0.16

- (a) Total number of producing wells at end of year.
 (b) Number of producing wells drilled during the year.
 (c) Number of non-producing wells drilled during the year.
 (d) Number of incomplete wells at the end of the year.
 * Includes 40 "shut in."

† This figure subsequently changed from \$174,147 to \$67,197.

Annual Production of Natural Gas.

Calendar Year.	Value.	Calendar Year.	Value.
1892.....	\$150,000	1904.....	\$ 328,376
1893.....	376,233	1905.....	379,561
1894.....	313,754	1906.....	583,523
1895.....	423,032	1907.....	815,032
1896.....	276,301	1908.....	1,012,660
1897.....	325,873	1909.....	1,207,029
1898.....	322,123	1910.....	1,346,471
1899.....	387,271	1911.....	1,907,678
1900.....	417,094	1912.....	2,362,700
1901.....	339,476	1913.....	2,309,381
1902.....	195,992	1914.....	3,484,727
1903.....	202,210	1915.....	3,706,035

PEAT.

The only production of peat during 1915 was at the peat bog at Alfred, Prescott county, Ontario, operated by Messrs. Daoust and Belanger.

The total shipments during the year were 300 tons, valued at \$1,050, as against shipments in 1914 of 685 tons, valued at \$2,470, and shipments in 1913 of 2,600 tons, valued at \$10,100.

Statistics of the annual production of peat since 1900 are given in the following table:—

Annual Production of Peat.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1900.....	400	\$1,200	1908.....	60	\$ 180
1901.....	220	600	1909.....	60	240
1902.....	475	1,663	1910.....	841	2,604
1903.....	1,100	3,300	1911.....	1,463	3,817
1904.....	800	2,400	1912.....	700	2,900
1905.....	80	260	1913.....	2,600	10,100
1906.....	474	1,422	1914.....	685	2,470
1907.....	50	200	1915.....	300	1,050

Following is a list of publications on peat issued by the Mines Branch, Ottawa.

Report No. 19. "Peat and Lignite, their Manufacture and Uses in Europe." by Erick Nystrom, M.E., 1908 (Out of print).

Report No. 30. "Investigation of the Peat Bogs and Peat Fuel Industry of Canada, 1908." Bulletin No. 1, by Erick Nystrom and A. Anrep.

Report No. 71. Investigation of the peat bogs, and peat industry of Canada, 1909-10; to which is appended Mr. Alf. Larson's paper on Dr. M. Ekenberg's wet-carbonizing process: from Teknisk Tidskrift, No. 12, December 26, 1908—translation by Mr. A. v. Anrep, Jr.; also a translation of Lieut. Ekelund's pamphlet entitled "A solution of the peat problem," 1909, describing the Ekelund process for the manufacture of peat powder, by Harold A. Leverin, Ch.E. Bulletin No. 4—by A. v. Anrep. (Second edition, enlarged.) (Out of print).

Report No. 90. Reprint of Presidential Address delivered before the American Peat Society at Ottawa, July 25, 1910, by Eugene Haanel, Ph.D.

Report No. 151. Investigation of the Peat Bogs and the Peat Industry of Canada, 1910-1911. Bulletin No. 8, by A. Anrep.

Report No. 154. The Utilization of Peat Fuel for the Production of Power, being a record of experiments conducted at the Fuel Testing Station, Ottawa, 1910-1911. Report on—by B. F. Haanel, B.Sc.

Report No. 266. Investigation of the Peat Bogs and the Peat Industry, 1911-1912. Bulletin No. 9, by A. Anrep, Peat Expert.

Report No. 299. Peat, Lignite and Coal. Their value as Fuels for the Production of Gas and Power in the By-Product Recovery Producer. Report by B. F. Haanel, B.Sc.

Report No. 351. "Investigation of the peat bogs and the peat industry of Canada, 1913-1914." Bulletin No. 11. A. Anrep.

PETROLEUM.

The production of petroleum in 1915 was 215,464 barrels (of 35 Imperial gallons) valued at \$300,572, as compared with a production in 1914 of 214,805 barrels, valued at \$343,124, in 1913 of 228,080 barrels, valued at \$406,439, and in 1912, of 243,336 barrels, valued at \$345,050. The average price per barrel realized in recent years has been as follows: \$1.395 in 1915; \$1.597 in 1914; \$1.782 in 1913, \$1.418 in 1912, and \$1.225 in 1911.

The production of crude petroleum has come almost solely from Ontario. New Brunswick has been a producer for about eight years to the extent of less than 3,000 barrels annually. There was a small production reported from one of the prospect wells in Alberta in 1914, but no record of production in this Province during 1915 has been received by the Mines Department.

The New Brunswick production has been as follows: 95 barrels in 1909, 1,485 barrels in 1910, 2,461 barrels in 1911, 2,679 barrels in 1912, 2,111 barrels in 1913, 1,725 barrels in 1914, and 1,020 barrels in 1915. The 1915 production in Ontario was 214,444 barrels valued at \$299,149, as against a production in 1914 of 212,693 barrels valued at \$338,182.

In Ontario, although a slight increase is shown in 1915, the production of crude oil is steadily but surely declining in spite of attempts being made by drilling to enlarge the areas of producing fields, or to find new ones. In the newer producing fields, as Dutton, Onondaga, and Tilbury, the decline is relatively rapid; in the older fields of Lambton and Bothwell, it is relatively slow.

New Brunswick petroleum production has been confined to Albert county where at present The Maritime Oil-Fields, Limited, are the only operators. The properties of this Company having developed a very considerable flow of gas, the operators have recently been concentrating their energies on gas development. New Brunswick possesses large deposits of bituminous shales richer in oil than the Scottish shales which have been exploited for many years at a profit.

Explorations for oil in southern Alberta were continued though much less actively during 1915. Mr. Slipper reports upon these operations in the Summary Report¹ of the Geological Survey from which the following extracts have been taken.

"In 1915 the area being explored for oil was extended to the prairie region south of the South Saskatchewan, where a few of the companies began boring operations. Two of the new wells struck artesian flows of fresh water at moderate depths."

¹ Summary Report of the Geological Survey, Dept. of Mines, Canada, 1915, p. 116.

"The energy displayed during 1914 in boring for oil in southern Alberta had, in 1915, greatly diminished. At present there are six drills working in the Turner valley; one in the area south and west of the valley; two in the foothills west of the Sarcee Indian reserve; one in the field west of Olds (Monarch field) and two on the prairie, south of the South Saskatchewan river."

"Reaction from the wild speculation of 1914, the financial conditions caused by the war, and the generally unsatisfactory results obtained, thus far, are the causes for the decrease in activity and the waning of public interest."

"Boring has proved that the Dakota and Kootenay formations, in the foothills are petrolific, and that if structural conditions are right they yield petroleum from several different beds when penetrated by the drill. Petroleum has been obtained, also, from thin, sand members of the Benton, in very small amount."

"However, none of the discoveries so far made can be considered seriously as a paying enterprise (with the possible exception of the Southern Alberta Company's well No. 1, which has not yet been fully tested). In fact, most of the oil finds so far reported have been mere seepages of no importance."

"The oil is very light, with a varying specific gravity, approximating 50 degrees Baume. It grades from light green in colour to colourless and has a paraffin base. Some of the product has been used in the crude state to run gasoline tractors."

"In the Sheep River area all the oil discovered came from the Turner Valley anticline. The wells drilled on either side of this fold were unproductive of favourable results."

"West of the Sarcee reserve, in one of the wells, a small amount of oil from the upper beds of the Dakota (?) was obtained. The well was "shot" without increasing the amount of oil."

"The wells drilled in the prairie region south of the South Saskatchewan river have yielded a large volume of gas from a sand member in the lower Benton."

"Gas has been met with on the Turner Valley fold also, in fairly large volume. These finds should prove to be of considerable economic importance. In the Turner Valley, one of the companies estimates its gas flow at about 4,000,000 cubic feet per day. This gas comes from sand in the Benton, Dakota, and Kootenay, the greater part being from the last named formation."

"The Cretaceous formations overlying the Dakota have shown no evidence of being oil-bearing. The lower sandy portion of the Fort Benton

is in some cases a minor exception to this general rule. It is probably safe to say that the upper beds are hardly worth prospecting for oil. However, there are gas horizons that may be of value to individual farmers and ranchers. When reached in shallow borings in many cases they supply the farmer with sufficient gas for light and power."

"None of the bore-holes which were started in formations above the Benton have reached the Dakota, though one or two are over 3,000 feet deep. The rest, or most of them, have been discontinued."

The statistics of production of petroleum during recent years are compiled from the records of the Department of Trade and Commerce, as being the most accurate basis available. These figures are secured in connexion with the payment of a bounty of $1\frac{1}{2}$ cents per gallon by the Dominion Government on all crude oil produced from wells, or oil-shales, in Canada, the claim for bounties having to be substantiated as to quantity by the certificate of the receiving stations, tank companies, refiners, or other purchasers, as well as by the supervising officers on bounties.

Statistics of production of crude oil from 1881, in barrels of 35 gallons each, with the total value, and average price per barrel, are given in the following table.

Annual Production of Crude Petroleum.

Year.	Barrels of 35 gallons.	Value.	Average.	Year.	Barrels of 35 gallons.	Value.	Average.
1881.....	368,987	.....	.....	1898.....	758,391	\$1,061,747	\$1.400
1882.....	389,573	.....	.....	1899.....	808,570	1,202,020	1.484
1883.....	472,866	.....	.....	1900.....	710,498	1,151,007	1.620
1884.....	571,000	.....	.....	1901.....	622,392	1,008,275	1.620
1885.....	587,563	.....	.....	1902.....	530,624	951,190	1.792
1886.....	584,061	\$525,655	\$0.90	1903.....	486,637	1,048,874	2.155
1887.....	713,728	556,708	0.78	1904.....	503,474	935,895	1.858
1888.....	695,203	713,695	1.024	1905.....	634,095	856,028	1.350
1889.....	704,690	653,600	0.924	1906.....	569,753	761,760	1.337
1890.....	795,030	902,734	1.18	1907.....	788,872	1,057,088	1.340
1891.....	755,298	1,010,211	1.334	1908.....	527,987	747,102	1.415
1892.....	779,753	984,438	1.264	1909.....	420,755	559,604	1.330
1893.....	798,406	874,255	1.094	1910.....	315,895	388,550	1.230
1894.....	829,104	835,322	1.004	1911.....	291,092	357,073	1.225
1895.....	726,138	1,086,738	1.494	1912.....	243,336	345,050	1.418
1896.....	726,822	1,155,647	1.59	1913.....	228,080	406,439	1.782
1897.....	709,857	1,011,546	1.424	1914.....	214,805	343,124	1.597
				1915.....	215,464	300,572	1.395

The following table gives statistics of the bounties paid to date by the Dominion Government on production of crude oil in Canada, from wells or oil shales, the bounty being $1\frac{1}{2}$ cents per gallon.

Record of Bounty Paid by Dominion Government on Production of Crude Petroleum.

Calendar Year.	Bounty Paid.	Calendar Year.	Bounty Paid.
1905.....	\$332,900	1910.....	\$165,845
1906.....	299,120	1911.....	152,823
1907.....	414,158	1912.....	127,751
1908.....	277,193	1913.....	119,742
1909.....	220,897	1914.....	112,569
		1915.....	112,577

The production of crude oil in the Province of Ontario, by districts, since 1910, is shown in the following table. The record has been furnished by the Supervisor of Petroleum Bounties at Petrolia, and agrees very closely, although not identically, with the statistics of the Department of Trade and Commerce used in compiling the record of production for the whole of Canada.

Production of Crude Petroleum in Ontario by Districts.

Field.	1911.	1912.	1913.	1914.	1915.
	Bls.	Bls.	Bls.	Bls.	Bls.
Lambton.....	184,450	150,272	155,747	154,186	161,368
Tilbury and Romney.....	48,707	44,727	26,824	18,530	12,742
Bothwell.....	35,244	34,486	34,348	33,961	33,395
Leamington.....					
Dutton.....	6,732	4,335	4,610	2,190	5,401
Onondaga (Brant county).....	13,501	7,115	4,172	2,437	1,490
Belle River.....			464	1,191	46
Total.....	288,634	240,935	226,165	212,495	214,442

Inspection of Petroleum.

At present there are five oil refineries in Canada: one at Sarnia, Ontario, and one at Ioco, near Vancouver, British Columbia, both owned by the Imperial Oil Company, of Sarnia, Ontario; one at Petrolia, Ontario, owned by the Canadian Oil Company of Toronto, Canada; one at Wallaceburg, Ontario, owned by the Empire Refining Company; and one at Toronto owned by the British American Oil Company. At each of these refineries considerable quantities of imported crude oil are handled. Domestic crude oil is refined chiefly by the Imperial Oil Company and occasionally by some of the other refineries.

All refined illuminating oils and naphtha manufactured and shipped from Canadian refineries are inspected by the Department of Inland Revenue. The total quantity inspected for the fiscal year ending March 31, 1916, was 64,014,398·79 gallons as compared with 46,382,785·09 gallons during the fiscal year 1915, and 33,602,017·27 gallons during the fiscal year 1914.

The following tables, showing the quantities of refined illuminating oils and naphtha inspected in the several districts, are quoted from the annual report of the Department of Inland Revenue.

Return of Inspected Petroleum and Naphtha Shipped from Refineries During the Fiscal Year Ending March 31, 1916.

Divisions.	Petroleum.	Naphtha.	Total.
	Gals.	Gals.	Gals.
London, Ont.....	30,773,387·11	21,107,425·88	51,880,812·99
Toronto, Ont.....	2,360,506·00	3,463,122·00	5,823,628·00
Vancouver, B.C.....	1,641,661·70	4,668,296·10	6,309,957·80
	34,775,554·81	29,238,843·98	64,014,398·79

Comparative Statement of Inspected Petroleum and Naphtha Shipped from Canadian Refineries During the Fiscal Years Ending March 31, 1910-1916.

Fiscal Year.	Petroleum.	Naphtha.	Total.
	Gals.	Gals.	Gals.
1910.....	19,100,424·16	4,113,149·46	*23,213,573·62
1911.....	21,017,628·45	6,517,655·41	*27,535,283·86
1912.....	20,886,072·43	5,577,591·62	*26,463,664·05
1913.....	22,485,437·34	6,880,761·85	*29,366,199·19
1914.....	22,986,328·66	10,615,688·61	*33,602,017·27
1915.....	31,117,405·08	15,265,380·01	46,382,785·09
1916.....	34,775,554·81	29,238,843·98	64,014,398·79

* All from Ontario Refineries.

Exports of Petroleum.

The exports of crude oil from Canada are comparatively small, the available statistics being shown in the next table following. During 1915 the exports as published by the Customs Department included: crude oil 35,977 gallons, valued at \$1,789, refined oils 103,488 gallons, valued at \$14,107, naphtha and gasoline 16,644 gallons, valued at \$4,540, or a total of 156,109 gallons, valued at \$20,436. There was also an export of 1,247,376 gallons, valued at \$290,943 of "other oils, n.e.s.," which probably included products of petroleum. In 1914 the exports included: crude oil 3,996

gallons, valued at \$362, refined oils 3,922 gallons, valued at \$826, naphtha and gasoline 43,023 gallons, valued at \$11,607, or a total of 50,941 gallons, valued at \$12,795. There was also an export of 455,867 gallons, valued at \$104,179 of "other oils, n.e.s.," which may have included products of petroleum.

Exports of Crude and Refined Petroleum.

Calendar Year.	CRUDE OIL.		REFINED OIL.		TOTAL.	
	Gals.	Value.	Gals.	Value.	Gals.	Value.
1881.....					501	\$ 99
1882.....					1,119	286
1883.....					13,283	710
1884.....					1,098,090	30,168
1885.....					337,967	10,562
1886.....					241,716	9,855
1887.....					473,559	13,831
1888.....					196,602	74,542
1889.....					235,855	10,777
1890.....					420,492	18,154
1891.....	446,770	\$ 18,471	585	\$ 104	447,355	18,575
1892.....	310,387	12,945	1,146	100	311,533	13,045
1893.....	107,719	3,696	2,196	394	109,915	4,090
1894.....	53,985	2,773	5,297	513	59,282	3,286
1895.....	22,831	1,044	10,237	2,023	33,068	3,067
1896.....	601	101	7,489	999	8,090	1,100
1897.....			342	49	342	49
1898.....	96	4	12,735	3,001	12,831	3,005
1899.....			3,425	859	3,425	859
1900.....			8,559	2,394	8,599	2,396
1901.....	14,168	691	375	66	14,543	757
1902.....	400	40	626	146	1,026	186
1903.....	350	15	1,013	190	1,363	205
1904.....	4,207	213	2,126	470	6,333	683
1905.....	35	2	7,228	2,078	7,263	2,080
1906.....	900	141	8,938	1,401	9,838	1,542
1907.....	1,125	102	3,132	575	4,257	677
1908.....			296	71	296	71
1909.....			7,768	934	7,768	934
1910.....			2,818	462	2,818	462
1911.....			24,448	4,500	24,448	4,500
1912.....	18,500	3,964	62,736	10,408	81,236	14,372
1913.....	3,650	379	*42,148	7,472	45,798	7,851
1914.....	3,996	362	*46,945	12,433	50,941	12,795
1915.....	35,977	1,789	*120,132	18,647	156,109	20,436

* Includes naphtha and gasoline.

Imports of Petroleum.

The total value of the imports of petroleum and petroleum products in 1915 was \$8,047,781, as against a value of \$11,174,763 in 1914.

The total imports of petroleum oils, crude and refined, in 1915 were 236,923,765 gals., valued at \$7,979,264. The oil imports included, crude oil 192,588,487 gals., valued at \$3,678,021, refined and illuminating oils, 6,792,873 gals., valued at \$405,019; gasoline 28,030,972 gals., valued at \$2,693,717, lubricating oils 4,547,179 gals., valued at \$755,535, and other oils, products of petroleum 4,954,254 gals., valued at \$446,972. The oil imports in 1914 were: crude oil 195,207,210 gals., valued at \$5,750,971; refined and illuminating oils 12,833,065 gals., valued at \$970,481; gasoline

24,396,401 gals., valued at \$2,747,360; lubricating oils 5,767,676 gals., valued at \$940,143, and other oils, products of petroleum 6,283,621 gals., valued at \$663,407, making a total of 244,487,973 gals., valued at \$11,072,362.

The imports of petroleum products in 1915 included 980,662 pounds of paraffin and paraffin wax candles valued at \$68,517, as compared with imports in 1914 of 1,594,236 pounds, valued at \$102,401.

In British Columbia, particularly, the use of crude oil for fuel is increasing rapidly, the imports of crude oil into that Province for the past few years having been as follows: For the fiscal year ending March 31, 1913, 80,234,743 gallons, valued at \$1,443,789; for the fiscal year ending March 31, 1914, 110,585,434 gallons, valued at \$2,282,299, and for the fiscal year ending March 31, 1915, 110,641,693 gallons, valued at \$2,174,634.

Details of imports of petroleum and petroleum products during the calendar years 1914 and 1915 are given in the following table:—

Imports of Petroleum and Petroleum Products During the Calendar Years 1914 and 1915.

Products.	1914.		1915.	
	Gals.	Value.	Gals.	Value.
(a) Petroleum crude, fuel and gas oils (0.8235 specific gravity or heavier).....	195,152,861	\$ 5,746,107	192,548,743	\$3,675,253
(b) Crude petroleum, gas oils (other than benzene, naphtha and gasoline).....	54,349	4,864	39,744	2,768
(c) Coal and kerosene, distilled, purified, or refined.....	12,670,085	905,124	6,658,460	348,444
(d) Illuminating oils composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon..	162,980	65,357	134,413	56,575
(e) Lubricating oils composed wholly or in part of petroleum, costing less than 25 cents per gallon	4,775,154	629,311	3,678,253	488,215
(f) Products of petroleum, n.o.p.	6,283,621	663,407	4,954,254	446,972
(g) Lubricating oils, n.o.p.	992,522	310,832	868,926	267,320
(h) Gasoline.....	24,396,401	2,747,360	28,030,972	2,693,717
Total.....	244,487,973	11,072,362	236,913,765	7,979,264
Paraffin wax.....	pounds 1,218,969	57,527	pounds 756,234	40,965
Paraffin wax candles.....	375,267	44,874	224,428	27,552
Total.....		11,174,763		8,047,781

The total annual imports of petroleum and petroleum products are shown in the three tables following. The first table gives imports of petroleum, crude and refined; the second imports of paraffin wax; and the third imports of paraffin wax candles.

Imports of Crude and Refined Petroleum.

Fiscal Year.	Gals.	Value.	Fiscal Year.	Gals.	Value.
1880.....	687,641	\$131,359	1898.....	9,074,311	\$ 724,519
1881.....	1,437,475	262,168	1899.....	10,394,208	763,303
1882.....	3,007,702	398,031	1900.....	9,633,647	864,833
1883.....	3,086,316	358,546	1901.....	11,082,822	982,640
1884.....	3,160,282	380,082	1902.....	13,220,005	1,107,207
1885.....	3,767,441	415,195	1903.....	18,799,312	1,643,371
1886.....	3,819,146	421,836	1904.....	24,521,115	2,152,623
1887.....	4,290,003	467,003	1905.....	35,296,332	2,151,514
1888.....	4,523,056	408,025	1906.....	32,624,410	1,908,177
1889.....	4,650,274	484,462	1907 (9 mos.).....	23,645,861	1,480,261
1890.....	5,075,650	515,852	1908.....	40,213,542	2,577,059
1891.....	5,071,386	498,330	1909.....	51,700,476	3,219,243
1892.....	5,649,145	475,732	Calendar Year.		
1893.....	6,002,141	446,389	1910.....	84,629,334	4,826,763
1894.....	6,597,108	439,988	1911.....	116,892,689	6,009,730
1895.....	7,577,674	525,372	1912.....	186,787,484	11,858,533
1896.....	8,005,891	735,913	1913.....	222,779,028	13,238,429
1897.....	8,415,302	697,169	1914.....	244,487,973	11,072,362
			1915.....	236,913,765	7,979,264

Imports of Paraffin Wax.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1883.....	43,716	\$ 5,166	1900.....	47,400	\$ 3,529
1884.....	39,010	6,079	1901.....	118,848	9,639
1885.....	59,967	8,123	1902.....	225,885	12,750
1886.....	62,035	7,953	1903.....	592,642	28,674
1887.....	61,132	6,796	1904.....	418,967	18,440
1888.....	53,862	4,930	1905.....	81,992	7,795
1889.....	63,229	5,250	1906.....	112,612	9,721
1890.....	239,229	15,844	1907 (9 mos.).....	55,021	5,922
1891.....	753,854	50,275	1908.....	62,308	8,041
1892.....	733,873	48,776	1909.....	129,631	12,795
1893.....	452,916	38,935	Calendar Year.		
1894.....	208,099	15,704	1910.....	1,192,616	58,673
1895.....	163,817	11,579	1911.....	1,688,216	75,661
1896.....	150,287	10,042	1912.....	1,901,586	85,491
1897.....	138,703	7,945	1913.....	1,291,615	72,351
1898.....	103,570	5,987	1914.....	1,218,969	57,527
1899.....	92,242	4,025	1915.....	756,234	40,965

Imports of Paraffin Wax Candles.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880.....	10,445	\$2,269	1898.....	60,802	\$ 4,427
1881.....	7,494	1,683	1899.....	62,331	5,856
1882.....	5,818	1,428	1900.....	27,663	3,671
1883.....	7,149	1,734	1901.....	44,562	3,588
1884.....	8,755	2,229	1902.....	51,120	5,752
1885.....	9,247	2,449	1903.....	83,377	9,025
1886.....	12,242	2,587	1904.....	83,471	9,078
1887.....	21,364	3,611	1905.....	137,353	15,293
1888.....	22,054	2,829	1906.....	148,808	15,804
1889.....	8,038	1,337	1907 (9 mos.).....	38,900	5,088
1890.....	7,233	1,186	1908.....	156,934	20,035
1891.....	10,598	2,116	1909.....	110,858	14,806
1892.....	9,259	1,952	Calendar Year.		
1893.....	8,351	1,735	1910.....	169,619	21,433
1894.....	10,818	1,685	1911.....	271,571	30,763
1895.....	19,448	2,541	1912.....	242,420	34,029
1896.....	25,787	4,072	1913.....	337,222	37,546
1897.....	25,114	2,929	1914.....	375,267	44,874
			1915.....	224,428	27,552

Petroleum Regulations.

The regulations under which petroleum and natural gas rights on Dominion lands may be secured were revised in January, 1914. The full text of the regulations, which are briefly outlined herewith, may be obtained from the Mining Lands and Yukon Branch of the Department of the Interior. They are entitled "Regulations for the disposal of petroleum and natural gas rights, the property of the Crown in Manitoba, Saskatchewan, Alberta, the Northwest Territories, the Yukon Territory, the Railway Belt in the Province of British Columbia, and within the tract containing three and one-half ($3\frac{1}{2}$) million acres of land acquired by the Dominion Government, and referred to in sub-section 6 of section 3 of the Dominion Lands Act." Approved by Order-in-Council dated the 19th day of January, 1914.

These regulations provide for the leasing of petroleum and natural gas rights under an area of not more than 1,920 acres to one applicant for a period of twenty-one (21) years, subject to a rental of twenty-five (25) cents an acre for the first year, and fifty (50) cents an acre for each subsequent year.

The lessee is required to have upon the lands leased, within one year of the date of the lease, such machinery as the Minister may consider necessary for the carrying on of prospecting operations, and is required to begin boring operations within fifteen months of the date of the lease, which shall be continued with reasonable diligence, with a view to the discovery of oil or natural gas.

The lessee is required to prevent the injurious access of water to the oil-bearing formation, and should gas be discovered, must take all reasonable and proper precautions to prevent the waste of natural gas.

Provision is made in the regulations that on or after January 1, 1930, a royalty may be charged on the petroleum products from locations leased under these regulations, and that at any time a royalty may be levied on the natural gas products of the leasehold.

Any company acquiring, by assignment or otherwise, a lease shall at all times be and remain a British company registered in Great Britain or Canada.

PHOSPHATE.

The small production of phosphate or apatite, which has been obtained in Canada since 1896, has been produced almost altogether as a by-product in connexion with the mining of mica. Shipments during 1915 totalled 217 tons, valued at \$2,502, as compared with 954 tons, valued at \$7,275 in 1914, and 385 tons, valued at \$3,643 in 1913.

Phosphate is used at Buckingham, Que., in the manufacture of fertilizers, phosphorus, and ferro-phosphorus, and the main supply is now imported from Florida.

For a number of years previous to 1892, there was a considerable production of apatite from the district north of Buckingham, the annual output varying from 20,000 tons to 30,000 tons. The introduction of the cheaply-mined phosphates of the southern states, however, resulted in the collapse of the Canadian industry, though it was claimed at the time of closing down that there was no diminution in the available supply of mineral.

Statistics of production and exports are shown in tables following:—

Annual Production of Phosphate.

Calendar Year.	Tons.	Value.	Average value per ton.	Calendar Year.	Tons.	Value.	Average value per ton.
1886.....	20,495	\$304,338	\$14.85	1901.....	1,033	\$ 6,280	\$ 6.07
1887.....	23,690	319,815	13.50	1902.....	856	4,953	5.79
1888.....	22,485	242,285	10.77	1903.....	1,329	8,214	6.18
1889.....	30,988	316,662	10.21	1904.....	817	4,590	5.62
1890.....	31,753	361,045	11.37	1905.....	1,300	8,425	6.48
1891.....	23,588	241,603	10.24	1906.....	850	6,375	7.50
1892.....	11,932	157,424	13.20	1907.....	824	6,018	7.30
1893.....	8,198	70,942	8.65	1908.....	1,596	14,794	9.26
1894.....	6,861	41,166	6.00	1909.....	998	8,054	8.07
1895.....	1,822	9,565	5.25	1910.....	1,478	12,578	8.51
1896.....	570	3,420	6.00	1911.....	621	5,206	8.38
1897.....	908	3,984	4.39	1912.....	164	1,640	10.00
1898.....	733	3,665	5.00	1913.....	385	3,643	9.46
1899.....	3,000	18,000	6.00	1914.....	954	7,275	7.63
1900.....	1,415	7,105	5.02	1915.....	217	2,502	11.53

Exports of phosphate in 1915 are reported by the Department of Customs as 179 tons valued at \$1,860, and in 1914 as 247 tons valued at \$677.

The imports of phosphate rock (fertilizer) for 1915 were valued at \$14,148; acid phosphate (not medicinal) 1,964,131 pounds, valued at \$105,035, and phosphorus 75,900 pounds, valued at \$29,572.

The imports of phosphate rock (fertilizer) during 1914 were valued at \$20,220; acid phosphate (not medicinal) 1,874,486 pounds, valued at \$97,862; and phosphorus 20,994 pounds, valued at \$6,760.

Phosphorus is manufactured at Buckingham by the Electric Reduction Company. The exports of phosphorus during the twelve months ending December 31, 1915, were 545,050 pounds, valued at \$77,476, as compared with 610,350 pounds, valued at \$92,303 in 1914, and 534,340 pounds, valued at \$73,395 in 1913.

Exports of Phosphate.

Calendar Year.	ONTARIO.		QUEBEC.		TOTAL.	
	Tons.	*Value.	Tons.	*Value.	Tons.	*Value.
1878.....	824	\$12,278	9,919	\$195,831	10,743	\$208,109
1879.....	1,842	20,565	6,604	101,470	8,446	122,035
1880.....	1,387	14,422	11,673	175,664	13,060	190,086
1881.....	2,471	36,117	9,497	182,339	11,968	218,456
1882.....	568	6,338	16,585	302,019	17,153	308,357
1883.....	50	500	19,666	427,168	19,716	427,668
1884.....	763	8,890	20,946	415,350	21,709	424,240
1885.....	434	5,962	28,535	490,331	28,969	496,293
1886.....	644	5,816	19,796	337,191	20,440	343,007
1887.....	705	8,277	22,447	424,940	23,152	433,217
1888.....	2,643	30,247	16,133	268,362	18,776	298,609
1889.....	3,547	38,833	26,440	355,935	29,987	394,768
1890.....	1,866	21,329	26,591	478,040	28,457	499,369
1891.....	1,551	16,646	15,720	368,015	17,271	384,661
1892.....	1,501	12,544	9,981	141,221	11,482	153,765
1893.....	1,990	11,550	5,748	56,402	7,738	67,952
1894.....	1,980	10,560	3,470	29,610	5,450	40,170
1895.....	1	5	250	2,500	250	2,500
1896.....	1	5	299	2,990	300	2,995
1897.....	70	450	165	400	235	850
1898.....	21	240	702	8,000	723	8,240
1899.....	215	1,850	93	1,725	308	3,575
1900.....					Nil.	Nil.
1901.....					6	120
1902.....					70	1,880
1903.....					1	20
1904.....					191	5,348
1905.....					40	1,253
1906.....						
1907.....						
1908.....					1	30
1909.....					895	15,735
1910.....					3	100
1911.....						
1912.....						
1913.....						
1914.....					247	677
1915.....					179	1,860

* These values do not compare with those in Table of Annual Production; the spot value is adopted for the production, while the exports are valued upon quite a different basis.

Exports of Phosphorus.

Calendar Year.	Pounds.	Value.
1911.....	524,370	\$76,608
1912.....	543,620	66,806
1913.....	534,340	73,395
1914.....	610,350	92,303
1915.....	545,050	77,476

Imports of Acid Phosphate and Phosphorus.

Calendar Year.	Phosphate rock (fertilizer)	Acid phosphate.		Phosphorus.	
		Pounds.	Value.	Pounds.	Value.
1910.....	\$72,950	1,379,173	\$ 55,999	6,752	\$ 2,065
1911.....	46,217	1,334,643	60,882	14,818	4,384
1912.....	24,586	1,379,173	55,999	13,807	4,012
1913.....	16,070	1,987,775	89,543	17,600	5,856
1914.....	20,220	1,874,486	97,862	20,994	6,760
1915.....	14,148	1,964,131	105,035	75,900	29,572

PYRITES.

Pyrites ores are mined in the Province of Quebec at the Eustis mine, Eustis, the Weedon mine, and the Stratford mine in Stratford township. The shipping mines in Ontario were those at Sulphide and Queensboro in Hastings county, the Helen mine in Michipicoten, Algoma dist., and North-pines, Vermilion lake, Kenora dist.

The total shipments in 1915 were 286,038 tons, valued at \$985,190, and included 142,735 tons, valued at \$570,940 from Quebec, and 143,303 tons, valued at \$414,250 from Ontario mines.

The total shipments in 1914 were 228,314 tons, valued at \$744,508, and included 117,698 tons, valued at \$470,792 from Quebec, and 110,616 tons, valued at \$273,716 from Ontario mines.

The pyrites ores of the Eastern Townships of Quebec are cupriferous, the copper content of the shipping ores averaging about 2.75 per cent; they also carry small quantities of gold and silver.

The exports of pyrites from Canada in 1915, as reported by the Customs Department were 137,598 tons, valued at \$527,318, as compared with 89,999 tons, valued at \$377,985 exported in 1914, and 46,066 tons, valued at \$211,640 exported in 1913. Direct returns from operators, however, appear to indicate larger exports than is shown by this record and it is possible that some of the ore may be exported as "copper ore" and not as pyrites.

The imports of brimstone and crude sulphur during the calendar year 1915, were 30,182 tons, valued at \$480,317 as against 41,954 tons, valued at \$870,868, in 1914 and 30,433 tons, valued at \$633,114 in 1913.

No record is available of the quantity of sulphuric acid manufactured in Canadian plants. The imports of sulphuric acid during the calendar year 1915, according to Customs returns, were 281,413 pounds, valued at \$4,872, as compared with imports in 1914 of 332,274 pounds, valued at \$7,149.

Statistics of production and exports of pyrites, of imports of brimstone and crude sulphur, and of imports of sulphuric acid, are shown in the following tables:—

Annual Production of Pyrites.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886.....	42,906	\$193,077	1901.....	35,261	\$130,544
1887.....	38,043	171,194	1902.....	35,616	138,939
1888.....	63,479	285,656	1903.....	33,982	127,713
1889.....	72,225	307,292	1904.....	37,180	134,033
1890.....	49,227	123,067	1905.....	33,339	125,486
1891.....	67,731	203,193	1906.....	42,743	169,990
1892.....	59,770	179,310	1907.....	46,243	212,491
1893.....	58,542	175,626	1908.....	47,336	224,824
1894.....	40,527	121,581	1909.....	64,644	222,814
1895.....	34,198	102,594	1910.....	53,870	187,062
1896.....	33,715	101,155	1911.....	82,666	365,820
1897.....	38,910	116,730	1912.....	81,526	314,081
1898.....	32,218	128,872	1913.....	158,566	521,181
1899.....	27,687	110,748	1914.....	228,314	744,508
1900.....	40,031	155,164	1915.....	286,038	985,190

Imports: Brimstone* and Crude Sulphur.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880.....	1,775,489	\$27,401	1898.....	38,026,798	\$373,786
1881.....	2,113,720	36,956	1899.....	24,517,026	265,799
1882.....	2,375,821	40,329	1900.....	21,128,656	215,433
1883.....	2,336,085	36,737	1901.....	23,856,651	270,608
1884.....	2,195,735	37,463	1902.....	24,640,735	325,307
1885.....	2,248,986	35,043	1903.....	24,412,737	259,123
1886.....	2,922,043	43,651	1904.....	19,364,730	204,663
1887.....	3,103,644	38,750	1905.....	23,435,140	242,251
1888.....	2,048,812	25,318	1906.....	43,047,672	436,156
1889.....	2,427,510	34,006	1907 (9 mos.).....	25,854,615	277,439
1890.....	4,440,799	44,276	1908.....	51,806,739	517,249
1891.....	3,601,748	46,351	1909.....	44,049,172	426,569
1892.....	4,769,759	67,095	Calendar Year.		
1893.....	6,381,203	77,216	1910.....	45,669,739	474,619
1894.....	5,845,463	61,558	1911.....	43,862,954	446,491
1895.....	4,900,225	56,965	1912.....	77,294,039	806,690
1896.....	6,934,190	63,973	1913.....	60,865,975	633,114
1897.....	8,672,751	87,719	1914.....	83,907,805	870,868
			1915.....	60,364,184	480,317

* Brimstone, crude or in roll or flour, or sulphur in roll or flour.

Exports of Pyrites.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1894.....	8,532	\$33,205	1905.....	19,755	\$ 55,767
1895.....	7,705	38,298	1906.....	26,050	65,349
1896.....	15,002	33,837	1907.....	25,056	80,139
1897.....	15,096	30,812	1908.....	17,283	96,600
1898.....	9,804	26,387	1909.....	35,798	156,644
1899.....	15,599	34,084	1910.....	30,434	110,071
1900.....	17,620	41,182	1911.....	32,102	120,585
1901.....	24,971	57,263	1912.....	5,938	11,935
1902.....	18,584	50,178	1913.....	46,066	211,640
1903.....	21,067	59,604	1914.....	89,999	377,985
1904.....	18,279	49,911	1915.....	137,598	527,318

Imports of Sulphuric Acid.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1885.....	774,764	\$10,791	1901.....	448,608	\$ 5,272
1886.....	507,927	7,930	1902.....	420,731	4,626
1887.....	678,603	8,468	1903.....	102,314	2,332
1888.....	2,494,648	35,415	1904.....	113,407	2,563
1889.....	181,652	2,606	1905.....	920,804	8,227
1890.....	211,871	2,927	1906.....	822,585	8,558
1891.....	177,627	2,466	1907.....	733,151	6,901
1892.....	222,628	2,837	1908.....	650,095	7,582
1893.....	172,422	2,367	1909.....	241,388	3,298
1894.....	107,520	1,648	Calendar Year.		
1895.....	174,605	2,481	1910.....	2,474,802	21,702
1896.....	114,137	1,430	1911.....	1,031,803	9,281
1897.....	977,446	8,033	1912.....	4,971,446	35,325
1898.....	665,344	5,536	1913.....	145,074	4,054
1899.....	165,637	2,427	1914.....	332,274	7,149
1900.....	740,858	7,066	1915.....	281,413	4,872

The following is a list of companies operating pyrites mines, in Canada:—

The Eustis Mining Company, Eustis, Que.

The Weedon Mining Company, Limited, Weedon, Que.

La Mine de Cuivre et Or, Stratford, Que.

The Nichols Chemical Company of Canada, Limited, Sulphide, Ont.,
and 25 Broad St., New York.

The Canadian Sulphur Ore Co., Ltd., Queensboro, Ont.

The Northern Pyrites Company, Northpines, Ont., and 25 Broad St.,
New York.

Algoma Steel Corporation, Limited, Sault Ste. Marie, Ont.

The Madoc Mining Co., Goudreau, Ont., and 25 Broad St., New York.

QUARTZ.

Considerable quantities of quartz are used by the smelters of nickel copper ores. It is also used in the manufacture of ferro-silicon, and ground quartz is used for the manufacture of sanitary and enamelled ware.

The total shipments in 1915 are reported as 127,108 tons, valued at \$205,153, as compared with shipments of 54,148 tons, valued at \$84,583 in 1914, and 78,261 tons, valued at \$169,842 in 1913.

Imports of silex or crystallized quartz in 1915 were 402 tons, valued at \$5,527, and the imports of flint were 4,327 tons, valued at \$48,966.

Imports of silex or crystallized quartz in 1914 were 870 tons, valued at \$15,502, and the imports of flint during the same year were 3,835 tons, valued at \$47,931.

Statistics of the annual production of quartz, so far as these have been obtained, are shown in the next table:—

Annual Production of Quartz.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1890.....	200	\$ 1,000	1907.....	56,585	\$124,148
1891-2.....			1908.....	44,741	52,830
1893.....	100	500	1909.....	56,924	71,285
1894-5-6.....	10	50	1910.....	88,205	91,951
1897.....			1911.....	60,526	83,865
1898.....	284	570	1912.....	100,242	195,216
1899.....	600	1,260	1913.....	78,261	169,842
1900-1905.....			1914.....	54,148	84,583
1906.....	48,376	65,765	1915.....	127,108	205,153

Imports of Silex: Crystallized Quartz.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880.....	5,252	\$2,290	1898.....	3,104	\$ 2,773
1881.....	3,251	1,659	1899.....	3,951	2,595
1882.....	3,283	1,678	1900.....	4,021	2,876
1883.....	3,543	2,058	1901.....	3,562	2,106
1884.....	3,259	1,709	1902.....	4,388	3,858
1885.....	3,527	1,443	1903.....	3,514	2,762
1886.....	2,520	1,313	1904.....	5,547	4,409
1887.....	14,533	5,073	1905.....	8,931	4,475
1888.....	4,808	2,385	1906.....	7,465	8,347
1889.....	5,130	1,211	1907 (9 mos.).....	11,964	12,969
1890.....	1,768	2,617	1908.....	24,938	19,166
1891.....	3,674	1,929	1909.....	6,206	6,909
1892.....	1,429	1,244	Calendar Year.		
1893.....	2,447	1,301	1910.....	12,577	11,996
1894.....	2,451	1,521	1911.....	7,877	7,518
1895.....	2,882	1,881	1912.....	12,571	10,680
1896.....	3,289	2,174	1913.....	13,797	13,811
1897.....	2,564	3,415	1914.....	17,407	15,502
			1915 (Duty free.)..	8,036	5,527

SALT.

The production of salt in Canada has for a number of years been obtained from salt fields in southwestern Ontario, although there was at one time a very small production in New Brunswick and Manitoba.

The total sales of salt in 1915 were 119,900 tons, valued at \$600,226, exclusive of packages. The value of the packages used was returned as \$280,747. The average number of men employed during the year was 254 and the amount paid in wages \$186,059. Stocks of salt in manufacturers' hands at the close of the year were reported as 3,613 tons.

The total sales of salt in 1914 were 107,038 tons, valued at \$493,648, exclusive of packages. The average number of men employed during the year was 253, and the amount of wages paid \$178,277. The value of the packages used during the year was \$278,879, and stock of salt in manufacturers' hands at the close of the year was reported as 4,519 tons.

Detailed statistics of the production during the past six years, showing the total sales of salt, the value of the sales, exclusive of packages, the value of the packages used, stock in manufacturers' hands at the end of each year, number of men employed, wages paid, and the total annual production since 1886 are given in the following tables.

Detailed Statistics of Production of Salt, 1910-1915.

	1910.	1911.	1912.	1913.	1914.	1915.
Sales of salt.....Tons.	84,092	91,582	95,053	100,791	107,038	119,900
Value of salt (exclusive of packages).....\$	409,624	443,004	459,582	491,280	493,648	600,226
Value of packages.....\$	173,446	198,789	224,696	262,479	278,879	280,747
Stock in manufacturers' hands at end of year.....Tons	2,474	1,422	3,256	4,066	4,519	3,613
Men employed.....No.	208	225	231	251	253	254
Wages paid.....\$	112,909	123,040	155,648	178,386	178,277	186,059

Annual Production of Salt.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886.....	62,359	\$227,195	1901.....	59,428	\$262,328
1887.....	60,173	166,394	1902.....	64,456	292,581
1888.....	59,070	185,460	1903.....	62,452	297,517
1889.....	32,832	129,547	1904.....	69,477	321,778
1890.....	43,754	198,857	1905.....	67,340	320,858
1891.....	45,021	161,179	1906.....	76,720	329,130
1892.....	45,486	162,041	1907.....	72,697	342,315
1893.....	62,324	195,926	1908.....	79,975	378,798
1894.....	57,199	170,687	1909.....	84,037	415,219
1895.....	52,376	160,455	1910.....	84,092	409,624
1896.....	43,960	169,693	1911.....	91,582	443,004
1897.....	51,348	225,730	1912.....	95,053	459,582
1898.....	57,142	248,639	1913.....	100,791	491,280
1899.....	59,339	254,390	1914.....	107,038	493,648
1900.....	62,055	279,458	1915.....	119,900	600,226

Exports and Imports.

Comparatively small quantities of salt are now exported from Canada, the exports in 1915 being 889,300 pounds, valued at \$5,836, as compared with exports of 952,700 pounds, valued at \$5,229 in 1914.

The imports of salt on the other hand are quite considerable, and in total value greatly exceed the domestic production.

During the calendar year 1915 the imports of salt subject to duty included: salt in bulk 27,613 tons, valued at \$84,449. and salt in bags, barrels or other packages 6,867 tons, valued at \$50,997. Salt imported from the United Kingdom or any British possession or imported for the use of sea or gulf fisheries, duty free, was imported to the extent of 103,006 tons, valued at \$382,080, giving total imports of 137,486 tons, valued at \$517,526.

For the calendar year 1914 the imports of salt subject to duty included: salt in bulk 26,065 tons, valued at \$82,149, and salt in bags, barrels, or other packages 7,828 tons, valued at \$68,959. Salt imported from the United Kingdom or any British possession, or imported for the use of sea or gulf fisheries, duty free, was imported to the extent of 108,753 tons, valued at \$389,773, giving total imports of 142,646 tons, valued at \$540,881.

The total consumption of salt, domestic and imported, was in 1915 approximately 256,942 tons, valued at \$1,111,916, as compared with a consumption in 1914 of 249,208 tons, valued at \$1,029,300.

The statistics of exports of salt since 1880, are shown in tables following:

Exports of Salt.

Calendar Year.	Bushels.	Value.	Calendar Year.	Bushels.	Value.
1880.....	467,641	\$46,211	1899.....	11,205'	\$2,773
1881.....	343,208	44,627	1900.....	37,653	8,997
1882.....	181,758	18,350	1901.....	39,224	6,510
1883.....	199,733	19,492	1902.....	9,331	3,798
1884.....	167,029	15,291			
1885.....	246,794	18,756		Pounds.	
1886.....	224,943	16,886	1903.....	1,915,648	5,927
1887.....	154,045	11,526	1904.....	1,006,036	4,186
1888.....	15,251	3,987	1905.....	1,447,728	6,112
1889.....	8,557	2,390	1906.....	618,707	3,437
1890.....	6,605	1,166	1907.....	2,222,542	7,709
1891.....	5,290	1,277	1908.....	529,229	3,840
1892.....	2,000	504	1909.....	276,765	2,488
1893.....	4,940	1,267	1910.....	275,200	2,618
1894.....	4,639	1,120	1911.....	454,600	5,055
1895.....	4,865	959	1912.....	289,150	3,723
1896.....	3,842	899	1913.....	460,900	3,047
1897.....	5,383	1,193	1914.....	952,700	5,229
1898.....	5,202	1,252	1915.....	889,300	5,836

Imports: Salt Paying Duty.

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880.....	726,640	\$ 3,916	1898.....	11,068,785	\$ 32,792
1881.....	2,588,465	6,355	1899.....	11,781,453	32,839
1882.....	3,679,415	12,318	1900.....	11,028,337	30,180
1883.....	12,136,968	36,223	1901.....	11,625,688	34,087
1884.....	12,770,950	38,949	1902.....	13,892,849	39,605
1885.....	10,397,761	31,726	1903.....	14,554,693	41,785
1886.....	12,266,021	39,181	1904.....	29,779,183	73,826
1887.....	10,413,258	35,670	1905.....	18,473,868	58,056
1888.....	10,509,799	32,136	1906.....	21,366,064	59,805
1889.....	11,190,088	38,968	1907 (9 mos.).....	21,834,435	58,553
1890.....	15,135,109	57,549	1908.....	31,019,400	79,341
1891.....	15,140,827	59,311	1909.....	31,653,900	83,660
1892.....	18,648,191	65,963	Calendar Year.		
1893.....	21,377,339	79,838	1910.....	40,347,500	97,326
1894.....	15,867,825	53,336	1911.....	46,351,900	109,793
1895.....	8,498,404	29,881	1912.....	60,134,500	133,869
1896.....	7,665,257	24,550	1913.....	63,015,000	147,775
1897.....	11,911,766	33,470	1914.....	67,786,600	151,108
			1915.....	68,961,200	135,446

	1914.		1915.	
	Pounds.	Value.	Pounds.	Value.
Salt, fine, in bulk, n.e.s. (a).....	52,131,100	\$ 82,149	55,226,400	\$ 84,449
Salt, n.e.s., in bags, barrels or other packages (b)...	15,655,500	68,959	13,734,800	50,997
Total.....	67,786,600	151,108	68,961,200	135,446

(a) Duty 5c per 100 lbs. (b) Duty 7½c per 100 lbs.

Imports: Salt Not Paying Duty.*

Fiscal Year.	Pounds.	Value.	Fiscal Year.	Pounds.	Value.
1880.....	212,714,747	\$400,167	1898.....	202,634,927	\$293,410
1881.....	231,640,610	488,278	1899.....	183,046,365	267,520
1882.....	166,183,962	311,489	1900.....	193,554,550	295,253
1883.....	246,747,113	386,144	1901.....	216,271,603	339,887
1884.....	225,390,121	321,243	1902.....	238,648,737	385,629
1885.....	171,571,209	255,719	1903.....	232,708,675	361,185
1886.....	180,205,949	255,359	1904.....	198,634,047	338,082
1887.....	203,042,332	285,455	1905.....	196,907,500	340,954
1888.....	184,166,986	220,975	1906.....	203,080,000	352,214
1889.....	180,847,800	253,009	1907 (9 mos.).....	139,459,900	240,841
1890.....	158,490,075	252,291	1908.....	200,944,800	350,878
1891.....	195,491,410	321,239	1909.....	232,237,700	376,961
1892.....	201,831,217	314,995	Calendar Year.		
1893.....	191,595,530	281,462	1910.....	217,587,000	364,735
1894.....	196,668,730	328,300	1911.....	202,347,100	326,325
1895.....	201,691,248	332,711	1912.....	219,278,900	352,081
1896.....	205,005,100	338,888	1913.....	225,877,200	417,508
1897.....	215,844,484	312,117	1914.....	217,505,500	389,773
			1915.....	206,011,600	382,080

* Salt imported from the United Kingdom, or any British possession, or imported for the use of the sea or gulf fisheries.

Consumption of Salt in Canada in 1914 and 1915.

	1914.		1915.	
	Pounds.	Value.	Pounds.	Value.
Canadian salt production.....	214,076,000	\$ 493,648	239,800,000	\$ 600,226
Less exports.....	952,700	5,229	889,300	5,836
	213,123,300	488,419	238,910,700	594,390
Imports of salt paying duty.....	67,786,600	151,108	68,961,200	135,446
Imports of salt free of duty.....	217,505,500	389,773	206,011,600	382,080
	498,415,400	1,029,300	513,883,500	1,111,916

In 1911 the Canadian Salt Company, at their Sandwich plant, commenced the manufacture of caustic soda by the electrolytic method, the liberated chlorine being utilized for the manufacture of bleaching powder.

The annual imports of caustic soda and chloride of lime since 1910 are shown in the accompanying table.

Imports of Caustic Soda and Chloride of Lime.

	Caustic Soda.		Chloride of Lime.	
	Pounds.	Value.	Pounds.	Value.
1910.....	13,974,444	\$267,338	10,386,519	\$116,923
1911.....	13,812,053	259,982	11,725,167	118,501
1912.....	14,544,545	278,579	12,183,765	113,346
1913.....	15,983,298	291,008	12,761,153	115,614
1914.....	18,436,827	314,278	15,147,645	138,619
1915.....	7,737,149	184,468	12,015,999	112,142

The following is a list of operators:—

Operator.	Address.	Location.	No. of Wells.	Depth.
†New Brunswick Salt Works.....	Plumweseep, N.B.....	Plumweseep...	1	Ft. 370
The Canadian Salt Co., Ltd.....	Windsor, Ont.....	Windsor.....	7	1,200 to 1,700
		Sandwich.....	2	1,200 & 1,700
The Western Salt Co., Ltd.....	Courtright, Ont.	Courtright.....	1	1,800
		Mooretown.....	1	1,700
Stapleton Salt Works.....	Clinton, Ont., Box 29.....	Stapleton.....	1	1,300
North American Chem. Co.....	"	Goderich.....	1	1,200
*Jas. H. Kittermaster & Carter.....	Sarnia, Ont., 191 Front N.	*Mooretown.....	1	"
The Dominion Salt Co., Ltd.....	Sarnia, Ont.....	Sarnia.....	3	1,700 & 2,10
*The Sarnia Salt Co., Ltd.....	Windsor, Ont., 34 Elliott..	"	1	1,750
The Elarton Salt Works Co., Ltd.....	Hyde Park Corner, Ont.....	Warwick.....	1	1,397
*Parkhill Salt Co.....	Parkhill, Ont.....	Parkhill.....	1	1,300
Exeter Salt Works Co., Ltd.....	Exeter, Ont.....	Exeter.....	1	1,225
*Hensall Salt Works.....	Hensall, Ont.....	"	1	1,250
Western Can. Flour Mills Co., Ltd.....	Goderich, Ont.....	Goderich.....	1	1,100
*Goderich Salt Works (P. McEwan Est.)	"	"	1	1,050
Ontario Peoples Salt & Soda Co., Ltd..	Kincardine, Ont.....	Kincardine....	1	981
Wingham Salt Works.....	Wingham, Ont.....	Wingham.....	1	1,200
*Prairie Lime & Salt Co., Ltd.....	Edmonton, Alta.....	Mafeking, Man.....	"	"
*B. C. Salt Works, Ltd.....	Prince Rupert, B.C.....	Kwinitsa.....	1	300

*Not in operation.

†Development work in progress.

TALC.

Talc is being mined in the Province of Ontario only, three mines being operated during 1915 in the county of Hastings, at Madoc and Eldorado.

The total quantity of shipments by the operators of the mines in 1915 were 11,885 tons, valued at \$40,554, as compared with 10,808 tons, valued at \$40,418 in 1914, and 12,250 tons, valued at \$45,980 in 1913.

The operators are:—

Messrs. Cross & Wellington, Madoc, operating the Henderson mine on lot 14, concession XIV, Huntingdon township.

Anglo American Talc Corporation, Ltd., Madoc, operating the Connolly mine on W. half of lot 15, concession XIV, Huntingdon township.

Eldorite Limited, Eldorado, operating a mine and small mill near Eldorado, N.W. lot 20, concession V, Madoc township.

The Henderson mine has been operated for some years, the greater part of the output being sold to Geo. H. Gillespie & Co., who operate a grinding mill at Madoc, the balance being exported to the United States.

In 1915, 1,720 tons were shipped crude to the United States, the balance being sent to Canadian grinding mills. In 1914, 1,269 tons, and in 1913, 2,750 tons were shipped crude to the United States. The crude talc is valued at from \$2.50 to \$3.00 per ton at the mine, and the ground or re-fined talc during 1915 at an average of about \$11.00 per ton.

The imports of talc during the calendar year 1915 according to Customs Department returns, were 154 tons, valued at \$1,866 or an average value per ton of \$12.12, as against imports of 584 tons, valued at \$8,983, or an average value per ton of \$15.38 in 1914, and imports of 402 tons, valued at \$10,706, or an average value per ton of \$26.63 in 1913.

Annual Production of Soapstone and Talc.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1886.. .. .	50	\$ 400	1901.. .. .	259	\$ 842
1887.. .. .	100	800	1902.. .. .	689	1,804
1888.. .. .	140	280	1903.. .. .	990	2,739
1889.. .. .	195	1,170	1904.. .. .	840	1,875
1890.. .. .	917	1,239	1905.. .. .	500	1,800
1891.. .. .	Nil.	Nil.	1906.. .. .	1,234	3,030
1892.. .. .	1,374	6,240	1907.. .. .	1,534	4,602
1893.. .. .	717	1,920	1908.. .. .	1,016	3,048
1894.. .. .	916	1,640	1909.. .. .	4,350	10,300
1895.. .. .	475	2,138	1910.. .. .	7,112	22,308
1896.. .. .	410	1,230	1911.. .. .	7,300	22,100
1897.. .. .	157	350	1912.. .. .	8,270	23,132
1898.. .. .	405	1,000	1913.. .. .	12,250	45,980
1899.. .. .	450	1,960	1914.. .. .	10,808	40,418
1900.. .. .	1,420	6,365	1915.. .. .	11,885	40,554

STRUCTURAL MATERIALS AND CLAY PRODUCTS.

INTRODUCTORY.

The subjects included under this heading comprise, in the order treated: cement, clay products of various kinds, such as brick, sewerpipe and tile, pottery, etc., lime, sand-lime brick, sand and gravel, slate, and stone for building and other purposes, including granite, marble, limestone, sandstone, etc. Previous to 1912 no attempt had been made to collect a record of the production of sands and gravels in Canada, and the only statistics available were those of exports and imports. In 1912, however, a beginning was made in the collection of these statistics; but owing to the incompleteness of the available lists of producers and the failure of many to answer correspondence, only a very partial record was obtained. In 1913 the scope of the collection was extended to cover sands and gravels used by railways for ballasting, etc. The statistics of stone production do not include the stone used in making cement or lime, but are as complete as possible for all other established stone quarries; nevertheless there is undoubtedly a large production of stone for foundation work, road-making, and railway construction, of which no record is available.

The total value of the production of these structural products in 1915 was \$17,920,759, as compared with \$26,009,227 in 1914, and \$30,809,752 in 1913, the decrease in 1915 being \$8,088,468 or 31.1 per cent, as compared with the previous year, and \$12,888,993 or 41 per cent as compared with 1913.

The total value of the imports of the same class of products in 1915 was \$3,912,946, as against \$6,528,838 in 1914 and \$9,724,992 in 1913.

The total exports were valued at \$519,676 in 1915, as against \$941,661 in 1914, and \$618,102 in 1913.

The apparent total consumption of these structural products based upon the record of production, imports and exports, was in 1915 valued at \$21,314,029, as compared with \$31,596,404 in 1914; \$39,916,642 in 1913, and \$39,128,509 in 1912.

The approximate consumption in 1911 was slightly less than \$30,000,000 and about \$25,250,000 in 1910, and \$20,350,000 in 1909. The decrease in consumption in 1915 was \$10,282,375, or 32.2 per cent, while compared with 1913—the year of maximum consumption—the falling off was \$18,602,613, or 46.6 per cent.

A summary of the production, imports and exports, and consumption of structural materials and clay products in 1915, and in 1914, and the annual production from 1909 to 1913, are shown in tables herewith:—

Structural Materials, Calendar Year 1915.

	Production.	Imports.	Exports.	Con- sumption.
Cement, Portland.....	\$ 6,977,024	\$ 47,836	\$ 5,161	\$ 7,019,699
Clay products.....	3,914,488	2,998,465	45,572	6,867,381
Lime.....	1,015,702	98,040	15,617	1,098,125
Sand-lime brick.....	141,742	.....	.....	141,742
Sand and gravel.....	1,624,767	120,756	380,549	1,364,974
Slate.....	2,039	108,676	.....	110,715
Stone.....	4,244,997	539,173	72,777	4,711,393
	17,920,759	3,912,946	519,676	21,314,029

Structural Materials, Calendar Year 1914.

	Production.	Imports.	Exports.	Consumption
Cement, Portland.....	\$ 9,187,924	\$ 159,691	\$ 2,223	\$ 9,345,392
Clay products.....	6,871,957	4,467,140	48,073	11,291,024
Lime.....	1,360,628	211,123	16,927	1,554,824
Sand-lime brick.....	609,515	.....	.....	609,515
Sand and gravel.....	2,505,310	224,759	802,358	1,927,711
Slate.....	4,837	213,256	.....	218,093
Stone.....	5,469,056	1,252,869	72,080	6,649,845
	26,009,227	6,528,838	941,661	31,596,404

Production of Structural Materials, 1909-1913.

	1909.	1910.	1911.	1912.	1913.
Cement.....	\$ 5,345,802	\$ 6,412,215	\$ 7,644,537	\$ 9,106,556	\$11,019,418
Clay products.....	6,450,840	7,629,956	8,359,933	10,575,869	9,504,314
Lime.....	1,132,756	1,137,079	1,517,599	1,844,849	1,609,398
Sand-lime brick.....	201,650	371,857	442,427	1,020,386	906,665
Sand and gravel.....	(a) 256,166	(a) 407,974	(a) 408,110	1,512,099	2,258,874
Slate.....	19,000	18,492	8,248	8,939	6,444
Stone.....	3,127,135	3,650,019	4,328,757	4,726,171	5,504,639
Total.....	16,533,349	19,627,592	22,709,611	28,794,869	30,809,752

(a) Exports only.

The statistical situation in respect to the production of cement, clay and stone quarry products is very closely reflected in the annual records of values of building operations.

According to apparently reliable records, the total value of the building permits in twenty-five eastern cities in Canada increased from a little over \$26,000,000 in 1908 to over \$78,000,000 in 1912, and to nearly \$90,000,000 in 1913. The aggregate value of building permits in 15 western cities increased from about \$18,000,000 in 1908 to nearly \$117,000,000 in 1912, but fell off in 1913 to \$72,000,000. The total value of building permits in 40 cities in Canada during 1913, according to the above record, was thus about \$160,000,000. The large and rapidly increasing demand for building materials during the five years immediately preceding 1913 is thus clearly indicated.

However, while structural activity increased more rapidly in western Canada, this section was the first to feel the effects of the set back in 1913. Thus we find that the statistics of production of clay products in 1913 showed an increase in eastern provinces but a very great decrease in all provinces west of the Great Lakes.

Statistics of the value of building permits issued in 1913 and 1914, as published in the Labour Gazette of April 1915, show the total value of permits in 86 localities in 1913 as about \$171,000,000, and as about \$107,000,000 in 1914, or a falling off of over 37 per cent during the latter year. The same record shows building permits in 50 eastern cities in 1914, valued at \$70,000,000, as against \$97,000,000 in 1913, and permits in 36 western localities in 1914, valued at \$36,000,000, as against \$74,000,000 in 1913, a falling off of nearly 30 per cent in eastern Canada, as against over 50 per cent in western Canada.

For the year 1915, according to the Labour Gazette of March 1916, "Information was obtained from 82 localities, for which the total value of building permits issued during 1915 was \$37,064,100. For 80 of these 82 localities the Department had comparative figures for the year 1914, and the comparative totals for these localities were: 1915, \$36,939,734; 1914, \$103,331,972, a decline of \$66,392,238, or 64.2 per cent." The same record (see accompanying table) shows building permits in 52 eastern cities in 1915, valued at \$31,284,295, as against \$69,726,541 in 1914, and permits in 28 western localities in 1915, valued at \$5,655,439, as against \$33,605,431 in 1914, a falling off of 55.1 per cent in eastern Canada, as against over 83 per cent in western Canada.

It will be noted that building permits in eastern Canada have fallen from \$97,000,000 in 1913 to less than \$32,000,000 in 1915, a decrease of about 68 per cent, while in western Canada permits fell from \$117,000,000 in 1912 to less than \$6,000,000 in 1915, a decrease of over 95 per cent.

Building Permits Issued in Canada, 1915 and 1914.*

	1915.	1914.	Increase (+) Decrease (-)
Nova Scotia (6).....	\$ 1,593,087	\$ 1,407,693	+\$ 185,394
P. E. Island (1).....	62,000	39,000	+ 23,000
New Brunswick (4).....	986,389	951,105	+ 35,284
Quebec (9).....	12,688,414	25,681,485	- 12,993,071
Ontario (32).....	15,954,405	41,647,258	- 25,692,853
Manitoba (2).....	2,039,560	12,965,602	- 10,926,042
Saskatchewan (8).....	784,387	4,244,853	- 3,460,466
Alberta (8).....	541,383	7,207,323	- 6,665,940
British Columbia (10).....	2,290,109	9,187,653	- 6,897,544
Totals for 80 localities for which comparative returns were received.....	36,939,734	103,331,972	-66,392,238
Grand total, 82 localities, 1915.....	37,064,100		

* As published in the "Labour Gazette," March, 1916.

CEMENT.

The total quantity of cement made in 1915, according to returns received from the manufacturers, was 5,153,763 barrels of 350 pounds net each (901,909 tons), as compared with 8,727,269 barrels (1,527,272 tons), made in 1914, a decrease of 3,573,506 barrels (625,364 tons), or nearly 41 per cent.

The total quantity of Canadian Portland cement sold in 1915 was 5,681,032 barrels (994,181 tons) as compared with 7,172,480 barrels (1,255,184 tons) in 1914, a decrease of 1,491,448 barrels (261,003 tons) or 20·8 per cent.

The total consumption of cement in 1915 including Canadian and imported cement was 5,709,222 barrels of 350 pounds each (999,114 tons), as compared with 7,270,502 barrels (1,272,338 tons) in 1914, a decrease of 1,561,280 barrels (273,224 tons) or 21·5 per cent.

The production of cement in Canada during the past few years, though all classed as Portland, has included an output of Puzzolan cement, made from blast furnace slag at Sydney, N.S., and a small production of "natural Portland," made at Babcock, Manitoba, 75 miles southwest of Winnipeg, on the Canadian Northern railway. The slag cement plant at Sydney has, however, been idle during the past two years.

The production of cement in 1915 was derived from 20 plants, three of which though idle, made shipments from stock. Nine other plants were idle throughout the year and made no shipments. The total daily capacity of the 29 completed plants was 51,415 barrels. The year's production was less than one-third the capacity of available plants.

The completed plants were distributed as follows: one in Nova Scotia, using blast furnace slag; three in Quebec, using limestone and clay; sixteen in Ontario, of which ten used marl, and six limestone; two rock plants in Manitoba, one of which makes a "natural Portland"; four in Alberta, including one marl plant and three limestone plants; and three rock plants in British Columbia.

The average number of men employed in Canadian cement plants during 1915 was 1,686, and the total wages paid \$1,184,459. In 1914 the average number of men employed was 2,977 and wages paid \$2,271,006.

Statistics of the total annual sales of natural rock and Portland cement since 1887 are shown in the following table:—

Annual Production* of Cement.

Calendar Year	Natural rock cement.			Portland cement.			Total.	
	Barrels.	Value.	Average value.	Barrels.	Value.	Average value.	Barrels.	Value.
1887.....							69,843	\$ 81,909
1888.....							50,668	35,593
1889.....	90,474	\$ 69,790	\$0.77	Nil.	Nil.		90,474	69,790
1890.....	87,521	74,822	0.85	14,695	\$ 17,583	\$1.20	102,216	92,405
1891.....	90,846	103,479	1.14	2,633	5,082	1.93	93,479	108,561
1892.....	88,187	94,912	1.08	29,221	52,751	1.81	117,408	147,663
1893.....	126,673	130,167	1.03	31,924	63,848	2.00	158,597	194,015
1894.....	72,965	74,842	1.03	35,177	69,795	1.98	108,142	144,637
1895.....	66,219	60,795	0.92	62,075	112,880	1.82	128,294	173,675
1896.....	70,705	60,500	0.86	78,385	141,151	1.80	149,090	201,651
1897.....	85,450	65,893	0.77	119,763	209,380	1.75	205,213	275,273
1898.....	87,125	73,412	0.84	163,084	324,168	1.99	250,209	397,580
1899.....	147,387	119,308	0.81	255,366	513,983	2.01	396,753	633,291
1900.....	125,428	99,994	0.80	292,124	562,916	1.93	417,552	662,910
1901.....	133,328	94,415	0.71	317,066	565,615	1.78	450,394	660,030
1902.....	127,931	98,932	0.77	594,594	1,028,618	1.73	722,525	1,127,550
1903.....	92,252	74,655	0.81	627,741	1,150,592	1.83	719,993	1,225,247
1904.....	56,814	50,247	0.88	910,358	1,287,992	1.41	967,172	1,338,239
1905.....	14,184	10,274	0.72	1,346,548	1,913,740	1.42	1,360,732	1,924,014
1906.....	8,610	6,052	0.70	2,119,764	3,164,807	1.49	2,128,374	3,170,859
1907.....	5,775	4,043	0.70	2,436,903	3,777,328	1.55	2,441,868	3,781,371
1908.....	1,044	815	0.78	2,665,289	3,709,139	1.39	2,666,333	3,709,954
1909.....	0	0		4,067,709	5,345,802	1.31	4,067,709	5,345,802
1910.....	0	0		4,753,975	6,412,215	1.35	4,753,975	6,412,215
1911.....	0	0		5,692,915	7,644,537	1.34	5,692,915	7,644,537
1912.....	0	0		7,132,732	9,106,556	1.28	7,132,732	9,106,556
1913.....	0	0		8,658,805	11,019,418	1.27	8,658,805	11,019,418
1914.....	0	0		7,172,480	9,187,924	1.28	7,172,480	9,187,924
1915.....	0	0		5,681,032	6,977,024	1.23	5,681,032	6,977,024

* Quantities sold or used.

A comparison of the principal statistics of 1914 and 1915 showing the increase or decrease, as the case may be, is given in the next table.

In 1914 the output exceeded the sales, but this position was reversed during 1915, and a reduction in stocks at the end of the year amounting to 565,156 barrels is noted. The average price per barrel at the mill for all plants has been steadily falling, being \$1.23 in 1915, as against \$1.28 in 1914; \$1.27 in 1913; \$1.27 $\frac{3}{4}$ in 1912, and \$1.34 in 1911. The average price at the mill in the several provinces was: Quebec \$1.18 in 1915 and \$1.17 in 1914; Ontario \$1.08 in 1915 and \$1.10 in 1914; Manitoba \$1.84 in 1915 and \$1.83 in 1914; Alberta \$1.78 in 1915 and \$1.89 in 1914; British Columbia \$1.70 in 1915 and \$1.67 in 1914.

The imports of cement in 1915 again show a large falling off, over 71 per cent, from the imports in 1914, while the average price of imported cement has fallen from \$1.61 in 1913 to \$1.50 in 1914, and \$1.43 in 1915.

Comparison of Production, Sales, and Imports of Portland Cement in 1914 and 1915.

	1914.	1915.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used..... Bls.	7,172,480	5,681,032			1,491,448	20.8
Cement manufactured..... "	8,727,269	5,153,763			3,573,506	40.9
Stock on hand Jan. 1..... "	1,073,328	2,620,022	1,546,694	144.1		
Stock on hand Dec. 31..... "	2,628,117	2,062,961			565,156	21.5
Value of cement sold or used.... \$	9,187,924	6,977,024			2,210,900	24.1
Average price per barrel..... "	1.28	1.23			0.05	3.9
Wages paid..... "	2,271,006	1,184,459			1,086,547	47.8
Men employed..... No.	2,977	1,686			1,291	44.4
Imports of Portland cement.... Bls.	98,022	28,190			69,832	71.2
Value of cement..... \$	147,158	40,426			106,732	72.5
Average price per barrel..... "	1.50	1.43			0.07	4.7
Total consumption of cement in Canada..... Bls.	7,270,502	5,709,222			1,561,280	21.5

Of the total cement made in 1915, 429,268 barrels were made from marl and 4,724,495 barrels from limestone, whereas in 1914 the quantity made from marl was 641,869 barrels and 8,085,400 barrels from limestone and slag. In 1913, 1,491,131 barrels were made from marl and 7,395,202 barrels from limestone and slag. In 1912, 1,420,155 barrels were made from marl, and 5,720,849 barrels from limestone and slag; while in 1911, 1,626,857 barrels were made from marl and 4,050,682 barrels were made from limestone and slag. With the exception of the new plant at Marlboro, Alberta, practically all of the newer plants erected during the past few years have been limestone plants. The proportion of cement made from marl in 1908 was about 45 per cent of the total output as compared with 28 per cent in 1911, 20 per cent in 1912, 16.8 per cent in 1913, 7.3 per cent in 1914, and 8.3 per cent in 1915.

Statistics of the annual production of Portland cement since 1897, showing the quantity made, quantity sold, stocks on hand at the end of the year, value of sales, etc., are shown in the next table.

Annual Production of Portland Cement.

Year.	Number of operating plants.	Quantity made. Barrels.	Quantity sold. Barrels.	On hand Dec. 31. Barrels.	Value of sales.	Average per barrel.	Daily capacity of operating plants. Barrels.
1897.....			119,763		\$ 209,380	\$1.75	
1898.....			163,084		324,168	1.99	
1899.....			225,366		513,983	2.01	
1900.....			292,124		562,916	1.91	
1901.....	4	360,160	317,066	58,094	565,615	1.78	
1902.....	8	562,335	594,594	33,446	1,028,618	1.73	3,900
1903.....	9	714,136	627,741	128,386	1,150,592	1.83	4,850
1904.....	10	908,990	910,358	112,051	1,287,992	1.41	
1905.....	13	1,541,568	1,346,548	306,466	1,913,740	1.42	8,000
1906.....	15	2,152,562	2,119,764	302,356	3,164,807	1.49	10,500
1907.....	17	2,491,513	2,436,093	354,435	3,777,328	1.55	14,400
1908.....	23	3,495,961	2,665,289	1,214,021	3,709,139	1.39	27,500
1909.....	22	4,146,708	4,067,709	1,777,238	5,345,802	1.31	23,050
1910.....	22	4,396,282	4,753,975	832,038	6,412,215	1.35	25,835
1911.....	24	5,677,539	5,692,915	903,589	7,644,537	1.34	28,810
1912.....	24	7,141,004	7,132,732	903,094	9,106,556	1.28	36,515
1913.....	27	8,886,333	8,658,805	1,089,595	11,019,418	1.27	50,540
1914.....	24	8,727,269	7,172,480	2,628,117	9,187,924	1.28	48,815
1915.....	17	5,153,763	5,681,032	2,062,961	6,977,024	1.23	41,850

Imports and Exports.—The quantity of cement exported is not recorded but the value in 1915 is reported as \$5,161 as against a value of exports in 1914 of \$2,223, and \$1,739 in 1913.

The imports of cement previous to 1901 were larger than the Canadian production, but gave way steadily to the increasing domestic output until 1909, during which year the imports amounted to 142,194 barrels, or about 3 per cent of the Canadian consumption. From 1910 to 1912 inclusive there was a steady increase in the importation of cement, the imports in 1912 being 1,434,413 barrels. During four and one-half months of 1912 the duty was, on account of the scarcity in western Canada, reduced by one-half, and on May 31, 1913, a permanent reduction was made in the general tariff from 12½ cents to 10 cents per hundred pounds. The imports, however, have fallen to 254,093 barrels in 1913, 98,022 barrels in 1914, and 28,190 barrels in 1915.

The United States has been the principal source of imports during the past few years and supplied over 96 per cent of the imports in 1915, as compared with about 4 per cent from Great Britain. In 1914 about 71 per cent and in 1913, 68 per cent of the imports were from the United States.

The imports of cement during 1914 and 1915 by countries are shown in the next table.

Imports of Cement, 1914 and 1915.

	1914.				1915.			
	Cwt.	Per cent.	Value.	Average value.	Cwt.	Per cent.	Value.	Average value.
Great Britain.....	93,709	27.3	\$ 35,517	\$0.38	3,726	3.8	\$ 1,480	\$0.40
United States.....	241,910	70.5	108,487	0.45	94,938	96.2	38,946	0.41
Other countries.....	7,457	2.2	3,154	0.43	.....	.....	.....	.....
Totals.....	343,076	100.0	147,158	0.43	98,664	100.0	40,426	0.41
Equivalent in barrels of 350 lbs.....	98,022	.....	.....	.....	28,190	.....	.....	.....

A permanent revision of the cement duties was made in the early part of 1913, and from May 13, 1913, the cement duties have been as follows:

	British Preferential tariff.	Intermediate tariff.	General tariff.
Cement, Portland, and hydraulic or water lime, in barrels, bags, or casks, the weight of the package to be included in the weight for duty per hundred pounds.....	7 cents.....	10 cents.....	10 cents.
Bags in which cement or lime mentioned in the next preceding item is imported.....	15 per cent...	20 per cent...	20 per cent.

This is equivalent to a duty under the general and intermediate tariffs of 35 cents per barrel on cement, and 8 cents on the bags, or a total of 43 cents per barrel.

Statistics of the exports of cement since 1891 and of imports since 1880 are given in the next two tables.

Exports of Cement.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1891.....	\$2,881	1899.....	\$2,733	1907.....	\$ 9,618
1892.....	938	1900.....	3,296	1908.....	34,591
1893.....	1,172	1901.....	1,514	1909.....	113,362
1894.....	482	1902.....	2,267	1910.....	12,914
1895.....	937	1903.....	2,851	1911.....	4,067
1896.....	1,328	1904.....	5,494	1912.....	2,436
1897.....	644	1905.....	3,143	1913.....	1,739
1898.....	2,117	1906.....	7,551	1914.....	2,223
				1915.....	5,161

Imports of Cement.

Fiscal Year.	Cement and Mfrs. of N.E.S.*	Hydraulic cement.†			Portland cement.		
		Barrels.	Value.	Average value.	Barrels.	Value.	Average value.
1880.....	\$ 28	10,034	\$10,306	\$1.03	.....	\$ 55,774	.....
1881.....	298	7,812	7,821	1.00	.....	45,646	.....
1882.....	86	11,945	13,410	1.12	.....	66,579	.....
1883.....	548	11,659	13,755	1.18	.....	102,537	.....
1884.....	1,236	8,606	9,514	1.11	.....	102,857	.....
1885.....	1,315	5,613	5,396	0.96	.....	111,521	.....
1886.....	1,851	6,164	6,028	0.98	.....	120,398	.....
1887.....	1,419	6,160	8,784	1.43	102,750	148,054	\$1.44
1888.....	5,787	5,636	7,522	1.33	122,402	177,118	1.45
1889.....	10,668	5,835	7,467	1.28	122,273	179,406	1.47
1890.....	5,443	5,440	9,048	1.66	192,322	313,572	1.63
1891.....	2,890	3,515	6,152	1.75	183,728	304,648	1.66
1892.....	3,394	2,214	2,782	1.26	187,233	281,553	1.50
1893.....	2,909	4,896	8,060	1.65	229,492	316,179	1.38
1894.....	2,618	1,054	985	0.93	224,150	280,841	1.25
1895.....	2,112	5,333	7,001	1.31	196,281	242,813	1.24
1896.....	3,672	5,688	8,948	1.57	204,407	242,409	1.19
1897.....	4,318	2,494	3,937	1.58	210,871	252,587	1.20
		Cwt.			Cwt.		
1898.....	3,263	16,033	7,097	0.44	1,073,058	355,264	0.33
1899.....	8,929	1,678	694	0.41	1,300,424	467,994	0.36
1900.....	10,452	10,418	4,711	0.45	1,301,361	498,607	0.38
1901.....	4,890	17,784	6,865	0.39	1,612,432	654,595	0.41
1902.....	12,234	29,585	17,755	0.60	1,971,616	833,657	0.42
1903.....	16,281	13,690	6,333	0.46	2,316,853	868,131	0.37
1904.....	14,305	12,088	5,391	0.45	2,476,388	995,017	0.40
1905.....	18,489	16,961	10,690	0.63	4,228,394	1,234,649	0.29
1906.....	27,858	10,794	4,034	0.37	2,848,582	963,839	0.34
Calendar Year.							
1907.....	13,748	16,788	6,339	0.38	2,354,204	837,520	0.36
1908.....	5,843	2,752	921	0.33	1,641,672	531,045	0.32
1909.....	6,374	682	614	0.90	497,678	166,669	0.33
1910.....	7,718	365	349	0.96	1,222,586	468,046	0.38
1911.....	7,430	26,655	6,107	0.23	2,316,707	834,879	0.36
1912.....	9,698	†	.....	.....	5,020,446	1,960,529	0.39
1913.....	17,729	†	.....	.....	889,324	409,303	0.46
1914.....	12,533	†	.....	.....	343,076	147,158	0.43
1915.....	7,410	†	.....	.....	98,664	40,426	0.41

* Cement not elsewhere specified and manufactures of cement.

† From 1912 included in Portland cement.

Consumption of Cement.—The consumption of cement is represented practically by the domestic production, together with the imports, the exports being so comparatively small as to be negligible. The total con-

sumption of cement in Canada in 1915 was 5,709,222 barrels (999,114 tons), made up of 5,681,032 barrels (994,181 tons) of Canadian cement and 28,190 barrels (4,933 tons) of imported cement, the Canadian cement representing 99·5 per cent and the imported cement 0·5 per cent of the total.

In 1914 the total consumption of cement was 7,270,502 barrels (1,272,-338 tons), made up of 7,172,480 barrels (1,255,184 tons) of Canadian cement, and 98,022 barrels (17,154 tons) of imported cement, the Canadian cement representing 98·7 per cent, and the imported cement 1·3 per cent of the total.

In 1913 the total consumption of cement was 8,912,898 barrels (1,559,757 tons) made up of 8,658,805 barrels (1,515,291 tons) of Canadian cement, and 254,093 barrels (44,466 tons) of imported cement, the Canadian cement representing 97·1 per cent and the imported cement 2·9 per cent of the total.

Annual Consumption of Portland Cement.

Calendar Year.	Canadian.		Imported.		Total.
	Barrels.	Per cent.	Barrels.	Per cent.	Barrels.
1901.....	317,066	36	555,900	64	872,966
1902.....	594,594	52	544,954	48	1,139,548
1903.....	627,741	45	773,678	55	1,401,419
1904.....	910,358	54	784,630	46	1,694,988
1905.....	1,346,548	59	918,701	41	2,265,249
1906.....	2,119,764	76	665,845	24	2,785,609
1907.....	2,436,093	78	672,630	22	3,108,723
1908.....	2,665,289	85	469,049	15	3,134,338
1909.....	4,067,709	97	142,194	3	4,209,903
1910.....	4,753,975	93	349,310	7	5,103,285
1911.....	5,692,915	90	661,916	10	6,354,831
1912.....	7,132,732	83·3	1,434,413	16·7	8,567,145
1913.....	8,658,805	97·1	254,093	2·9	8,912,898
1914.....	7,172,480	98·7	98,022	1·3	7,270,502
1915.....	5,681,032	99·5	28,190	0·5	5,709,222

Nova Scotia.—There is but one cement plant in Nova Scotia, located at Sydney and operated by the Sydney Cement Company, Limited. Puzzolan cement is made from blast furnace slag and lime. This plant was idle throughout 1915.

Quebec.—This Province has three completed cement mills all operated by the Canada Cement Company, Limited; two situated near Montreal, at Longue Pointe, and Montreal East, and the third in Hull. The Montreal mills have now a combined capacity of 13,800 barrels per day, and the Hull mill 2,800 barrels per day. The total quantity of cement sold or used by producers during 1915 in this Province was 2,390,724 barrels, valued at \$2,812,797, as compared with 2,846,061 barrels, valued at \$3,331,601 in 1914.

Ontario.—Ontario continues as the most important cement-producing province in Canada having sixteen completed plants with a total daily capacity of 19,700 barrels at the end of 1915, of which eight were operated during the year, one of these for a month only. Of the eight plants operated, five used limestone and three marl. The eight idle mills included one limestone and seven marl plants. The names of the operating companies and location of plants are shown in an accompanying list of producers.

The total sales of cement in Ontario during 1915 were 2,407,670 barrels, valued at \$2,597,807, as compared with 2,775,142 barrels, valued at \$3,062,129 in 1914. There was thus a decrease in sales of 367,472 barrels, or over 13 per cent.

The detailed statistics of production during 1914 and 1915 are shown in the next table.

Cement Production in Ontario, 1914 and 1915.

	1914.	1915.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used..... Bls.	2,775,142	2,407,670	.....	.....	367,472	13.2
Cement manufactured..... "	3,183,053	2,325,912	.....	.....	857,141	26.9
Stock on hand Jan. 1..... "	439,113	842,957	403,844	92.0	.....	.....
Stock on hand Dec. 31..... "	847,024	761,199	.....	.....	85,825	10.1
Value of cement sold..... \$	3,062,129	2,597,807	.....	.....	464,322	15.2
Wages paid..... "	721,287	482,606	.....	.....	238,681	33.1
Men employed..... No.	1,088	801	.....	.....	287	26.4
Total daily capacity of operating plants..... Bls.	16,700	12,550	.....	.....	4,150	24.8

Manitoba.—The Commercial Cement Company of Winnipeg is operating a natural Portland cement plant at Babcock, 75 miles southwest of Winnipeg, on the Canadian Northern railway. The capacity of the plant is reported as about 200 barrels per day. The new mill of the Canada Cement Company near Winnipeg completed in 1914 has a daily capacity of 3,500 barrels. Limestone is obtained from a property in township 28, range 10, west of the first meridian, and about 130 miles north of Winnipeg, on the Oak Point branch of the Canadian Northern railway.

Alberta.—This Province possesses four completed cement plants with a total daily capacity of about 7,000 barrels, located respectively at Exshaw, Calgary, Blairmore, and Marlboro, the first three being limestone plants and the last mentioned using marl.

In addition to the completed plants, two other rock plants are in course of construction, one at Blairmore, by the Keystone Portland Cement Company, and one at Dauntless, near Medicine Hat, by the Canada Cement Company; the latter plant is being planned for a capacity of 1,000,000 barrels per annum.

The total quantity of cement marketed by producers in 1915 was 133,648 barrels, valued at \$415,009, as against 641,395 barrels, valued at \$2,212,342 in 1914.

The greater part of the sales during 1915 were from stock, only one plant, that at Blairmore, being in actual operation during the year, and for a period of less than three months.

British Columbia.—The two plants at Tod Inlet were in operation for about five months during 1915. The Vancouver Portland Cement Company's mill has a capacity of from 2,500 to 3,000 barrels per day. The mill of the Associated Cement Company (Canada), Ltd., successors to the Portland Cement Construction Company, Ltd., at Bamberton, has a daily capacity of about 2,000 barrels. In both cases the limestone, clay and shale are obtained in the vicinity of the works.

The plant at Princeton constructed by the British Columbia Portland Cement Co., Ltd., capacity 500 to 700 barrels per day, remained idle throughout 1914 and 1915.

The total sales of cement from British Columbia mills in 1915 were 309,436 barrels, valued at \$526,042, as compared with 499,151 barrels, valued at \$833,606 in 1914.

The production of cement in Ontario has already been shown separately and the aggregate production in all other provinces during 1914 and 1915 is given in the next table.

Cement Production in Other Provinces, 1914 and 1915.

	1914.	1915.	Increase.	Per cent.	Decrease.	Per cent.
Cement sold or used.....Bls.	4,397,338	3,273,362	.....	.....	1,123,976	25.6
Cement manufactured....."	5,544,216	2,827,851	.....	.....	2,716,365	48.9
Stock on hand Jan. 1....."	634,215	1,777,065	1,142,850	180.2	.....	.....
Stock on hand Dec. 31....."	1,781,093	1,301,762	.....	.....	479,331	26.9
Value of cement sold.....\$	6,125,795	4,379,217	.....	.....	1,746,578	28.5
Wages paid.....	1,549,719	701,853	.....	.....	847,866	54.7
Men employed.....No.	1,889	885	.....	.....	1,004	53.2
Total daily capacity of operating plants.....Bls.	32,115	29,300	.....	.....	2,815	8.8

List of Manufacturers of Cement.

OPERATOR AND ADDRESS.	LOCATION OF PLANT.	RAW MATERIALS USED.	KILNS.		TOTAL DAILY CAPACITY.	WORKS SUPERINTENDENT, OR REPRESENTATIVE.
			No.	LENGTH.		
<i>Nova Scotia.</i>						
Sydney Cement Co., Ltd., Sydney, N.S., Box 509.	Sydney.....	† Blast furnace slag	.....	FEET	BARRELS	H. C. Burchell.
<i>Quebec.</i>						
Canada Cement Co., Ltd., Montreal, Que., Herald Bldg.—					140 (?)	
<i>Ontario.</i>						
Montreal Mill No. 1.....	Montreal East.....	Limestone.....	4-4-9	125-110-150	12,000	{ F. P. Jones, Gen. Mgr.
Montreal Mill No. 2.....	Longue Pointe.....	"	4	125	1,800	H. L. Doble, Secy.
International Mill.....	Hull.....	"	10	60	2,800	F. B. Kilbourn, Supt.
La Société des Industries de Chambord.....	Chambord.....	†				J. S. Downs, Supt.
						Wm. O'Neill, Supt.
						T. L. Bergeron, Sec
<i>Ontario.</i>						
Canada Cement Co., Ltd., Montreal, Que.—						
Belleville Mill (No. 4).....	Belleville (Point Anne).....	Limestone.....	8	60	1,800	A. A. Huck, Supt.
Belleville Mill (No. 5).....	"	"	6	125	2,700	H. L. Shock, Supt.
Lakefield Mill.....	Lakefield.....	†	3-6	60-100	1,200	E. W. Bailey, Supt.
Marbank Mill.....	Marbank (Hungerford Tp) †	Marl.....	4-5	95-60	1,200	C. J. Matt, Act. Supt.
Port Colborne Mill.....	Port Colborne.....	Limestone.....	4	150	3,000	S. R. Preston, Supt.
Owen Sound Mill.....	Shallow Lake.....	† Marl.....	5	100	1,200	Alf. Harrington, Act. Supt.
The Maple Leaf Portland Cement Co., Ltd., Listowel, Ont.....	Atwood.....	"	2	100	350	Robt. Oliver.
The Ontario Portland Cement Co., Ltd., Brantford, 51 George.....	Blue Lake.....	"	4	70	500	J. A. Colter.
The National Portland Cement Co., Ltd., Durham, Ont.....	Durham.....	"	8	70	1,400	W. Calder.
The Hanover Portland Cement Co., Ltd., Hanover, Ont.....	Hanover.....	"	3	100	750	D. Knechtel.
Superior Portland Cement Co., Ltd., Orangeville, Ont.....	Orangeville.....	"	4	80	800	G. McIntyre.
(In liquidation).						
The Union Cement Co., Ltd., Owen Sound, Ont.....	Owen Sound.....	Limestone.....	4-1	60-70	800	T. L. Dates.
The Imperial Portland Cement Co., Ltd., Owen Sound, Ont.....	"	† Marl.....	3	100	650	D. J. Kennedy, V.P.
Ben Allen, Portland Cement Co., Ltd., Owen Sound, R. R. No. 7.....	Raven Lake.....	† Marl.....	1-3	125-60	500	J. D. McMillan, Pres.
Kirkfield Portland Cement Co., Ltd., Toronto, 34 Victoria.....	St. Marys.....	Limestone.....	2	160	1,700	J. G. Lind.
St. Marys Cement Limited, Toronto, 49 Wellington E.....	Warton.....	†	4	100	1,200	
The Crown Portland Cement Co., Ltd., Toronto, c-o 85 Bay, Liquidators						
<i>Manitoba.</i>						
The Commercial Cement Co., Ltd., Winnipeg, Man., 307 Quebec Bank	Babcock.....	Natural, P. C.....	4	40 (Vertical)	200	A. W. Gordon.
Canada Cement Co., Ltd., Montreal, Que.....	Winnipeg (Tuxedo).....	Limestone.....	4	150	3,500	P. H. Willis, Supt.

Alberta.

Canada Cement Co., Ltd., Montreal, Que.:—

Alberta Mill.....	Calgary.....	† Limestone.....	3	100	1,500	E. French, Supt.
Dauntless Mill.....	Dauntless.....	† ".....	3-3	80-150	3,000	A. G. Beck, Supt.
Exshaw Mill.....	Exshaw.....	† ".....	2	99	1,000	G. G. Harris.
The Rocky Mountains Cement Co., Ltd., Calgary, Alberta, Box 1694.....	Blairmore.....	† ".....	3	140	1,500	J. B. Griffith, Liquidator.
The Keystone Portland Cement Co., Ltd., Calgary, Box 1236.....	".....	† ".....				
The Edmonton Portland Cement Co., Ltd., Edmonton, 707 Tegler Bldg. (in liquidation).....	Marlboro.....	† Marl.....	3			

British Columbia.

The Associated Cement Co. (Canada) Ltd., Victoria, B.C., Box 1591.....	Bamberton.....	† Limestone.....	2	185	2,000	H. Anderson.
British Columbia Portland Cement Co., Ltd., Vancouver.....	Princeton.....	† ".....	1	125	600	Jno. D. Kearns, Liquidator.
(in liquidation)						
Vancouver Portland Cement Co., Ltd., Victoria. Box 681.....	Tod Inlet.....	† ".....	1-2-1-117	0-155-125-70	3,000	R. F. Butchart, Man. Dir.

† Idle 1915, or operated for few days only. †† Under construction. ‡ New plant, not yet operated.

CLAYS AND CLAY PRODUCTS.¹

For a number of years a small quantity of fireclay has been produced and sold as such, and during the past four years there has been a small but increasing production of kaolin or china-clay from a deposit in the Province of Quebec. With these exceptions, practically all of the clay production in Canada is manufactured by the producer, and this report, therefore, treats almost altogether of the manufactured product.

The clay products made in Canada comprise brick of various kinds, including common and pressed, ornamental and fancy building brick, paving brick, firebrick, porous fireproofing brick and blocks, sewerpipe and drain tile, pottery and sanitary ware, the last two products chiefly from imported clays.

The total value of the clay products sold or marketed in 1915 was \$3,914,488, as compared with \$6,871,957 in 1914, \$9,504,313 in 1913, and \$10,575,869 in 1912.

The production in 1915 was the lowest in ten years and, compared with 1914, shows a decrease of \$2,957,469 or 43 per cent. It was but little over one-third the maximum production reached in 1912.

During the five years preceding 1913 the annual production of clay products increased very rapidly, having more than doubled in that period. In 1913, however, the financial stringency affected building operations to such an extent as to greatly reduce the demand for building brick. There was actually a considerable increase in the quantity of common and pressed building brick manufactured during that year, but a large falling off in sales, so that large stocks of brick must have remained in manufacturers' hands at the close of the year. In 1914 there was a large falling off both in quantities of brick made and in quantities sold, and the stocks of common and pressed brick on hand at the end of the year were reported as 242,106,000, or about 44 per cent of the number sold during the year. In 1915 there

¹ Special investigations of the clay resources of Canada have been undertaken by the Department of Mines for a number of years and several special reports have been published thereon. The first work was undertaken by J. Walter Wells in 1905, under the direction of Dr. Haanel. In 1909, Dr. Heinrich Ries, Professor of Economic Geology in Cornell University, was engaged by the Geological Survey to carry on a general investigation of Canadian clays. Mr. Joseph Keele of the Geological Survey was associated with Dr. Ries in the work which has been continued during the past five years.

The following reports have been published dealing with clays.

Mines Branch, Department of Mines:—

"Clays and Shales of Manitoba: Their Industrial Value," Report on. By J. Walter Wells, 1905. (Out of print).

Geological Survey Branch, Department of Mines:—

"The Clay and Shale Deposits of Nova Scotia and Portions of New Brunswick." By H. Ries and J. Keele, 1911.

"Preliminary Report on the Clay and Shale Deposits of the Western Provinces." By H. Ries and J. Keele, 1912.

"The Clay and Shale Deposits of the Western Provinces, Part II." By H. Ries and J. Keele, 1913.

"Clay and Shale Deposits of New Brunswick." By J. Keele, 1914.

"Clay and Shale Deposits of the Western Provinces, Part III." By Heinrich Ries, 1914.

"Preliminary Report on the Clay and Shale Deposits of the Province of Quebec." By J. Keele, 1915, Memoir No. 64.

"Clay and Shale Deposits of the Western Provinces, Part IV." By H. Ries, 1915, Memoir No. 65.

"Clay and Shale Deposits of the Western Provinces, Part V." By J. Keele, 1915, Memoir No. 66.

has been again a large decrease both in quantity of brick made and in quantities sold. Sales, however, have considerably exceeded actual output, stocks having been depleted to a considerable extent to supply demand. Stocks of common and pressed brick on hand at the end of the year were reported as 147,817,000 or about 61 per cent of the stocks reported at the end of 1914. All classes of clay products showed a falling off in production with the exception of firebrick, pottery and kaolin. The average number of men employed in 1915 was 4,405 as compared with 8,339 in 1914 and 11,193 in 1913. The total wages paid in 1914 were \$1,452,828, as against \$3,201,380 in 1914, and \$4,682,801 in 1913.

Of the total value of the sales in 1915, building and paving brick, including fireproofing, contributed \$2,571,153 or about 65·6 per cent, as against \$5,258,179, or about 76·5 per cent of the total in 1914. Sewer-pipe and tile production in 1915 were valued at \$1,154,742, or 29·5 per cent of the total as against \$1,470,839, or 21 per cent of the total in 1914. The total value of the production of pottery in 1915 was reported as \$317,080 of which \$64,900 only is estimated as attributable to Canadian clays and the balance to imported clays. Compared with the previous year the production of building, paving, and fireproofing brick shows a decrease of 51 per cent, and the production of sewerpipe and tiles a decrease of 21 per cent.

The value of the production of fireclays and firebrick from domestic clays was \$110,693 as against \$107,568 in 1914. The production of kaolin in 1915 was 1,300 tons, valued at \$13,000, as against 1,000 tons, valued at \$10,000 in 1914.

The average price of common building brick for the whole of Canada in 1915 was \$7.48 per M, as compared with \$7.99 in 1914; \$8.85 in 1913; \$9.11 in 1912; \$8.37 in 1911; and \$8.13 in 1910. The average prices of pressed or front brick for the same years were respectively \$9.89, \$11.91, \$12.49, \$12.86, \$12.53, and \$11.89, thus showing a general increase in the cost of building brick until 1912, falling off again in 1913, 1914, and 1915.

Ontario is by far the largest producer of clay products, having contributed in 1915 nearly 58 per cent of the total values marketed during 1915 and 1914, as against 55 per cent in 1913.

Quebec contributed 23·5 per cent in 1915, as against 18·5 per cent the preceding year; Alberta 2·9 per cent in 1915, as compared with 6·7 per cent in 1914, and 9·4 per cent in 1913; Manitoba 2·4 per cent in 1915, as against 4·6 per cent in 1914, and British Columbia 5·8 per cent in 1915, as compared with 6 per cent in the previous year.

There was a falling off in the total sales of clay products in every province. As in the two previous years the falling off was most pronounced in the western provinces. The total decrease in the eastern provinces,

including Ontario, amounted to 36·7 per cent, while in the western provinces, including Manitoba, it was 64 per cent.

The following tables of production and of imports of clay products furnish comparisons of particular interest. In the first place an estimate of the value of consumption of clay products is furnished.

The total value of the imports in 1915 was \$2,998,465 (not including certain items probably in part covering clay products), and after deducting a small export, a total approximate consumption of clay products valued at \$6,867,381, is shown, of which 57 per cent was of domestic production.

In 1914 the approximate consumption was valued at \$11,291,024, of which about 61 per cent was of domestic production.

In 1913 the consumption was valued at \$16,212,733, of which 58·6 per cent was of domestic production.

In 1912 the consumption was valued at \$17,149,659, in 1911, \$13,516,477, in 1910, \$11,958,591, and in 1909, \$9,696,324. In 1909 about 70 per cent. of the consumption was of domestic production.

In the case of building brick the imports are small, compared with the home production, amounting to not much more than 5 per cent of the latter. The imports of paving brick in 1915 were more than three times, and those of firebrick over seven times the Canadian production. The imports of drain tile and sewerpipe were about 5 per cent of the Canadian production.

Statistics of production in 1915 and 1914 of the several classes of clay products by provinces are shown in the following tables:—

Production of Clay Products by Provinces, 1915.

Province.	No. of ac- tive firms reporting.	No. of men employed.	Wages.	Common brick.				Pressed brick.			Per M.
				No. manu- factured.	No. sold.	Value of sales.	Per M.	No. manu- factured.	No. sold.	Value of sales.	
Nova Scotia.....	11	204	\$ 75,219	4,340,000	6,462,000	\$ 48,684	\$ 7.53	100,000	100,000	\$ 1,500	\$15.00
New Brunswick.....	5	90	27,225	3,150,000	3,675,000	34,150	9.29	50,000	40,000	880	22.00
Quebec.....	33	980	308,856	74,834,971	79,744,548	566,085	7.10	3,219,000	3,990,517	62,766	15.73
Ontario.....	245	2,633	886,886	104,858,929	123,977,112	910,459	7.34	37,778,496	43,504,736	398,308	9.16
Manitoba.....	12	199	16,535	5,076,000	8,630,411	87,194	10.10	.....	.....	.....	.....
Saskatchewan.....	13	433	50,332	1,900,000	4,184,185	36,482	8.72	.....	422,860	7,119	16.82
Alberta.....	13	437	50,330	2,523,887	3,753,746	32,399	8.63	55,000	1,340,555	13,250	9.88
British Columbia.....	17	139	80,075	735,280	4,305,880	39,734	9.23	249,652	418,492	8,951	21.41
Total.....	349	4,405	1,452,828	196,819,067	234,732,882	1,755,187	7.48	41,452,148	49,817,160	492,774	9.89
Province.	Paving brick.		Ornamental.		Firebrick and fireclay shapes.	Fireproof- ing.	Pottery.	Sewerpipe.	Tiles, drain.	Kaolin.	Total clay products.
	No. sold.	Value.	No. sold.	Value.							
Nova Scotia.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	\$ 221,881
New Brunswick.....	.....	.....	.....	.....	\$ 22,741	\$ 3,720	\$ 200	\$144,836	\$ 200	.....	35,780
Quebec.....	.....	.....	253,439	\$12,140	15,156	41,040	18,638	180,000	9,600	\$13,000	918,425
Ontario.....	863,770	\$13,345	755,128	36,957	.....	146,915	46,062	361,350	341,467	.....	2,254,863
Manitoba.....	.....	.....	.....	.....	.....	6,480	.....	.....	.....	.....	93,674
Saskatchewan.....	.....	.....	.....	.....	805	.....	.....	.....	.....	.....	44,406
Alberta.....	.....	.....	.....	.....	.....	30,263	.....	39,460	324	.....	115,696
British Columbia.....	363,877	7,349	.....	.....	71,991	24,983	.....	73,800	2,955	.....	229,763
Total.....	1,227,647	20,694	1,008,567	49,097	(b) 110,693	253,401	(a) 64,900	799,446	355,296	13,000	3,914,488

(a) There was also a production of \$252,180 from imported clays.

(b) There was also a production of \$28,807 from imported clays.

Production of Clay Products by Provinces, 1914.

Province.	No. of active firms reporting.	No. of men employed.	Wages.	Common brick.				Pressed brick.			
				No. manu- factured.	No. sold.	Value of sales.	Per M.	No. manu- factured.	No. sold.	Value of sales.	Per M.
Nova Scotia.....	11	337	\$ 109,174	14,579,936	12,574,546	\$ 97,510	\$ 7.75	148,280	98,200	\$ 1,502	\$15.32
New Brunswick.....	18	507	26,977	5,584,000	6,033,528	64,042	10.61	200,000	100,000	2,250	22.50
Quebec.....	43	1,321	524,189	137,711,357	118,278,889	874,961	7.40	10,568,446	8,540,060	135,900	15.91
Ontario.....	282	4,727	1,946,581	300,721,629	249,896,642	1,963,921	7.86	90,003,675	72,153,067	777,199	10.77
Manitoba.....	13	364	119,838	21,072,050	26,777,950	289,060	10.79	1,603,000	2,238,000	28,428	12.59
Saskatchewan.....	14	309	72,152	11,485,600	6,865,000	61,669	8.98	2,235,000	1,850,000	32,030	17.31
Alberta.....	26	507	211,592	20,298,000	23,190,257	183,696	7.92	6,918,100	6,979,500	94,358	13.52
British Columbia.....	20	456	190,877	19,385,000	13,896,950	119,002	8.56	1,539,000	1,655,951	43,889	26.50
Total.....	419	8,339	3,201,380	525,837,572	457,513,762	3,653,861	7.99	113,215,501	93,634,858	1,115,556	11.91
Province.	Paving brick.		Ornamental.		Firebrick and fireday shapes.	Fireproof- ing and terra-cotta, etc.	Pottery.	Sewerpipe.	Tiles, drain.	Kaolin.	Total clay products.
	No. sold.	Value.	No. sold.	Value.							
Nova Scotia.....	.....	.....	.....	.....	\$ 13,204	\$ 484	.....	\$ 149,420	\$ 4,084	.....	\$ 266,204
New Brunswick.....	.....	.....	.....	.....	.....	.....	.....	.....	210	.....	66,502
Quebec.....	.....	.....	.....	.....	15,978	45,753	\$ 2,395	176,629	1,260	\$10,000	1,267,700
Ontario.....	2,566,000	\$47,534	1,121,236	\$ 4,824	.....	205,204	32,976	593,606	343,662	.....	3,979,606
Manitoba.....	.....	.....	.....	.....	4,650	.....	.....	.....	.....	.....	317,488
Saskatchewan.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	98,349
Alberta.....	7,000	245	272,300	3,264	.....	96,025	.....	83,036	1,575	.....	462,199
British Columbia.....	134,000	1,848	.....	.....	73,736	58,077	.....	101,808	15,549	.....	413,909
Total.....	2,707,000	49,627	1,554,496	23,592	(b) 107,568	405,543	(a) 35,371	1,104,499	366,340	10,000	6,871,957

(a) There was also a production of \$277,475 from imported clays. (b) There was also a production of \$30,264 from imported clays.

Sales of Clay Products, 1912 and 1913.

	1912.			1913.		
	Quantity.	Value.	Per M.	Quantity.	Value.	Per M.
Bricks—						
Common.....No.	769,191,532	\$ 7,010,375	\$ 9.11	668,426,675	\$5,917,373	\$ 8.85
Pressed....."	125,180,422	1,609,854	12.86	116,802,053	1,458,733	12.49
Paving....."	4,579,500	85,989	18.78	4,208,295	75,669	17.98
Ornamental....."	371,356	8,595	23.15	875,355	15,423	17.63
Firebrick and fireclay shapes, etc.		125,585			142,738	
Fireproofing and architectural terra-cotta, etc.		448,853			461,387	
Kaolin.....Tons.	20	160	8.00	500	5,000	10.00
Pottery.....		43,955			53,533	
Sewerpipe.....		884,641			1,035,906	
Tiles, drain.....		357,862			338,552	
Totals.....		10,575,869			9,504,314	

Sales of Clay Products by Provinces, 1910-1915.

Province.	1910.	1911.	1912.	1913.	1914.	1915.
Nova Scotia.....	\$ 204,782	\$ 274,249	\$ 272,053	\$ 332,272	\$ 266,204	\$ 221,881
New Brunswick.....	56,475	33,000	54,910	62,269	66,502	35,780
Quebec.....	1,442,842	1,341,467	1,680,460	1,606,816	1,267,700	918,425
Ontario.....	3,667,810	3,916,575	4,864,700	5,220,467	3,979,606	2,254,863
Manitoba.....	781,605	834,428	1,018,051	514,358	317,488	93,674
Saskatchewan.....	160,850	226,958	332,943	189,820	98,349	44,406
Alberta.....	753,232	1,052,751	1,356,184	893,408	462,199	115,696
British Columbia.....	562,360	675,505	996,568	684,904	413,909	229,763
	7,629,956	8,359,933	10,575,869	9,504,314	6,871,957	3,914,488

Annual Value of Production of Clay Products, 1899-1915.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1899.....	\$2,988,099	1904.....	\$3,841,560	1910.....	\$ 7,629,956
1900.....	3,195,105	1905.....	4,709,842	1911.....	8,359,933
1901.....	3,382,706	1906.....	5,072,635	1912.....	10,575,869
1902.....	3,625,489	1907.....	5,772,117	1913.....	9,504,314
1903.....	4,034,289	1908.....	4,500,702	1914.....	6,871,957
		1909.....	6,450,840	1915.....	3,914,488

Exports and Imports.—The total value of the exports of clay products in 1915 was \$45,572, and included 1,115,000 building brick, valued at \$9,089; manufactures of clay valued at \$25,202, and earthenware valued at \$11,281.

In 1914 the total value of the exports of clay products was \$48,073, which included 1,486,000 building brick valued at \$11,871, manufactures of clay valued at \$26,866, and earthenware valued at \$9,336.

Exports of Clay Products.

Calendar Year.	Building brick.		Manu- factures.	Earthen- ware.	Total.
	M.	Value.			
1910.....	390	\$ 2,762	\$ 9,061	\$ 9,240	\$21,063
1911.....	394	3,977	2,071	6,101	12,149
1912.....	694	8,493	256	10,001	18,750
1913.....	977	8,579	27,201	16,553	52,333
1914.....	1,486	11,871	26,866	9,336	48,073
1915.....	1,155	9,089	25,202	11,281	45,572

The imports of clays and clay products reached a total value during the calendar year 1915 of \$2,998,465, equivalent to about 76 per cent. of the domestic production. The total imports in 1914 were valued at \$4,467,-140 or about 66 per cent of the domestic production.

Clay imports are classified by the Department of Customs under three main subdivisions, including: brick and tile, earthenware and chinaware, and clays. The imports of clays in 1915 were valued at \$237,096, and included chiefly china-clay and fireclay, with a small quantity of pipe-clay and other clays not classified. The value of china-clay imported was \$124,658, and of fireclay \$87,267, in both cases a decrease from the imports of the previous year. In 1914 the total value of the imports of clays was \$288,128, and included china-clay valued at \$150,881, and fire-clay at \$90,233. The imports of these clays have varied considerably from year to year, the imports of china-clay in 1914 being the highest recorded, while the imports of fireclay in 1915 were the lowest since 1909.

The imports classified under brick and tile were valued in 1915 at \$1,301,359, as compared with a value of \$1,986,790 in 1914. A large portion of these imports is made up of firebrick, over 62 per cent in 1915. There is also a considerable import of building and paving brick, of sewerpipe and drain tile, and of building blocks, and manufactures of clay not specified.

The imports of earthenware and chinaware, of which the most important class is tableware, were valued in 1915 at \$1,460,010, as against \$2,192,222 in 1914. These imports are chiefly of a class of goods not manufactured in Canada and for which the raw materials are not as yet obtainable from Canadian sources.

The detailed record of imports during the calendar years 1910 to 1915 is shown in the next table.

Imports of Clay Products, Calendar Years, 1910 to 1915.

Imports.		1910.	1911.	1912.	1913.	1914.	1915.
Brick and tile:—							
Bath brick.....	\$	2,290	2,623	1,927	2,690	1,894	630
Building brick.....		274,482	475,865	763,470	575,269	353,353	114,958
Building blocks.....		.....	.....	.....	.....	.....	181,145
Paving brick.....		.....	.....	.....	.....	.....	176,817
Firebrick, of a class or kind not made in Canada.....		124,994	104,292	160,663	356,366	275,817	176,759
Fire brick, n.o.p.....		811,927	814,414	933,621	976,097	535,712	577,458
Drain tile, not glazed.....		.....	.....	.....	.....	.....	235,613
Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.....		4,485	5,640	4,018	12,156	2,941	346
Manufactures of clay, n.o.p.....		175,599	382,929	507,024	465,997	338,533	41,801
		361,996	523,998	818,467	339,760	178,056	72,649
Total.....		1,755,773	2,369,761	3,209,190	3,121,592	1,986,790	1,301,359
Earthenware and chinaware:—							
Brown or coloured earthenware and stoneware, and Rockingham ware.....		53,418	52,100	62,161	70,632	71,083	74,864
C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p.....		202,475	184,291	291,804	264,090	163,431	135,425
Demijohns, churns, or crocks.....		6,607	4,933	18,404	32,599	25,935	14,752
Tableware of china, porcelain, white granite or iron-stoneware.....		1,545,538	1,718,582	2,068,362	2,185,601	1,437,175	1,016,900
China and porcelain ware, n.o.p.....		95,509	62,025	71,751	43,696	30,006	18,312
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....		90,524	123,203	160,082	173,445	104,285	40,286
Earthenware tiles, n.o.p.....		125,772	154,351	239,391	296,791	186,161	92,700
Manufactures of earthenware, n.o.p.....		163,278	217,051	183,001	248,016	174,146	66,771
Total.....		2,283,116	2,516,536	3,094,956	3,314,870	2,192,222	1,460,010
Clays:—							
China-clay ground, or unground.....		142,125	125,768	127,402	149,337	150,881	124,658
Fireclay, ground or unground.....		124,293	125,199	140,500	143,399	90,233	87,267
Pipeclay, ground or unground.....		114	1,786	234	385	829	614
Clays all other, n.o.p.....		25,976	17,494	20,258	31,169	46,185	24,557
Totals.....		292,508	270,247	288,394	324,290	288,128	237,096
Grand total.....		4,331,397	5,156,544	6,592,540	6,760,752	4,467,140	2,998,465
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks and laundry tubs of any material.....		262,667	285,847	382,920	477,133	359,288	182,757
Chalk, china or Cornwall stone, cliff stone and feldspar, fluorspar, magnesite, ground or unground.....		121,959	147,640	167,990	164,879	113,211	100,012

(a) Nine months. (b) Included in manufactures of clay, n.o.p.

In addition to the imports of clay products there is also shown in the preceding table a considerable annual importation of "chalk, china or corn-wall stone, cliff stone and feldspar, fluorspar, magnesite ground or unground," much of which is no doubt used in connexion with the manufacture of clay products. The value of these imports during the calendar year 1915 was \$100,012, of which \$65,715 was from the United States, and \$34,297 from Great Britain. The value of the imports under this item during the calendar year 1914 was \$113,211. There is also shown an annual importation of "baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material," the value of such imports during 1915 being \$182,757, as compared with \$359,288 during the year 1914.

Imported clay products are derived chiefly from Great Britain and the United States, although considerable quantities of earthenware, china and porcelain ware, white granite or iron-stoneware, etc., are brought from Germany, France, Austria-Hungary, and Japan. The imports during the fiscal year, showing the country of origin, are shown in the next table. Of the brick and tile imported, 88·7 per cent was from the United States and 11 per cent from Great Britain; and only \$4,476 worth from all other countries. Of the earthenware and chinaware, 58·4 per cent was imported from Great Britain, 20·4 per cent from the United States, 7 per cent from Germany, 7·7 per cent from France, 4 per cent from Japan, and considerable values also from Austria-Hungary, and other countries. The crude clays were imported principally from Great Britain and the United States.

A record of the total annual value of the imports of clay products since 1900 is shown in the following table:—

Imports of Clay Products During the Twelve Months Ending March 1915, Showing Countries of Origin.

Imports.	Great Britain.	United States.	Germany.	France.	Austria-Hungary.	Japan.	Other countries.	Total.
Brick and tile:—								
Bath brick.....	\$ 1,571	65						\$ 1,636
Building brick.....	20,434	287,224						307,658
Building block.....	18,426	244,845						263,271
Paving brick.....	40,966	105,681						146,647
Firebrick of a class or kind not made in Canada.....	48,375	431,990	\$ 19				\$ 2,379	482,763
Firebrick, n.o.p.....	27,629	120,246		1,647				149,522
Drain tile, not glazed.....	964	1,868						2,832
Drain pipe, sewerpipe, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks, glazed or unglazed.....	30,755	268,109		\$ 121				298,985
Manufactures of clay, n.o.p.....	11,627	154,058	170	122		\$ 18		165,995
Total.....	200,747	1,614,086	1,836	243		18	2,379	1,819,309
Earthenware and chinaware:—								
Brown or coloured earthenware and stoneware, and Rockingham ware, C. C. or cream coloured ware, decorated, printed or sponged, and all earthenware, n.o.p.....	18,467	44,037	76	36		619	78	63,313
Demijohns, churns, or crocks.....	96,648	34,995	6,684	2,439	\$ 1,040	7,921	1,480	151,207
Tableware of china, porcelain, white granite or iron-stoneware.....	1,502	23,622	19				2	25,145
China and porcelain ware, imported by manufacturers of silverware.....	870,880	28,444	121,970	143,604	25,368	63,256	11,408	1,264,930
China and porcelain ware, n.o.p.....	37	116		597			355	750
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....	8,377	10,544	3,563	302	181	2,827		26,149
Earthenware tiles, n.o.p.....	9,973	73,117	18	757			608	84,473
Manufactures of earthenware, n.o.p.....	61,463	98,414	293	2				160,172
Total.....	65,985	83,556	10,474	1,325	601	1,341	1,344	164,626
Clays:—								
China-clay, ground or unground.....	1,133,332	396,845	143,097	149,062	27,190	75,964	15,275	1,940,765
Fired-clay, ground or unground.....	51,718	79,127						130,845
Pipeclay, ground or unground.....	12,939	77,784						90,723
Clays, all other, n.o.p.....	50	537				24		587
Total.....	1,935	43,321	453					45,733
Grand total.....	66,642	200,769	453			24		267,888
Per cent of total.....	1,400,721	2,211,700	145,386	149,305	27,190	76,006	17,654	4,027,962
	34.77	54.91	3.61	3.71	0.67	1.89	0.44	100.00
Baths, bath-tubs, basins, closets, lavatories, urinals, sinks, and laundry tubs of any material.....	117,242	198,705	5	428			35	316,415
Chalk, china or cornwall stone, cliff stone, and feldspar, fluorspar, magnesite, ground or unground.....	16,324	87,541	1,187	137			2,049	107,238

Imports of Clay Products (Total Value) 1900-15.

Fiscal Year.	Brick and tile.**	Earthenware and chinaware.	Clays.	Totals.
1900.....	\$ 145,914	\$ 959,526	\$122,965	\$1,228,405
1901.....	133,343	1,114,677	141,251	1,389,271
1902.....	172,281	1,275,093	140,521	1,587,895
1903.....	157,783	1,406,610	176,416	1,740,809
1904.....	259,421	1,611,356	144,706	2,015,483
1905.....	761,756	1,636,214	176,805	2,574,775
1906.....	1,000,372	1,692,359	220,504	2,913,235
1907*.....	770,686	1,422,880	178,240	2,371,806
1908.....	1,079,556	2,190,784	267,720	3,538,060
Calendar Year.				
1909.....	1,249,450	1,781,759	216,330	3,247,539
1910.....	1,755,773	2,283,116	292,508	4,331,397
1911.....	2,369,761	2,516,536	270,247	5,156,544
1912.....	3,209,190	3,094,956	288,394	6,592,540
1913.....	3,121,592	3,314,870	324,290	6,760,752
1914.....	1,986,790	2,192,222	288,128	4,467,140
1915.....	1,301,359	1,460,010	237,096	2,998,465

* 9 months ending March, 1907.

** Includes fireclay classified as "for use in process of manufactures."

The Canadian Customs duties affecting clays and clay products, in force during 1914, are shown as follows:—

Canadian Customs Duties on Clay Products.

(From the Customs Tariff, 1907, revised 1910).

	British Preferential tariff.	Intermediate tariff.	General tariff.
281 Firebrick of a class or kind not made in Canada.....	Free.	Free.	Free.
282 Building brick, paving brick, and mfgs. of clay or cement (n.o.p.)..	12½ %	20 %	22½ %
283 Drain tiles not glazed.....	15	17½	20
284 Drain pipes, sewerpipes, and earthenware fittings therefor, chimney linings or vents, chimney tops and inverted blocks glazed or unglazed, earthenware tiles (n.o.p.).....	25 "	32½ "	35 "
285 Tiles or blocks of earthenware or of stone prepared for mosaic flooring.....	20 "	27½ "	30 "
286 Earthenware and stoneware, viz., demijohns, churns, or crocks....	20 "	27½ "	30 "
287 Tableware of china, porcelain, white granite or ironstone.....	15 "	27½ "	27½ "
288 Earthenware and stoneware, brown or coloured and Rockingham ware "C.C." or cream coloured ware, decorated, printed or sponged, and all earthenware (n.o.p.).....	20 "	27½ "	30 "
289 Closets, urinals, basins, lavatories, baths, bath-tubs, sinks, and laundry tubs of earthenware, stone, cement or clay or of other material.....	20 "	30 "	35 "
295 Clays, including china-clays, fireclay and pipe-clay, not further manufactured than ground; ganister and sand; gravels; earths, crude only.....	Free.	Free.	Free.

CLAY BUILDING BRICK.

The total sales from Canadian plants of clay building brick including common and pressed brick, but excluding ornamental, paving, firebrick, and fireproofing brick, are shown by provinces, for the past four years, in the following tables:—

In 1915 the total sales were 284,550,042, valued at \$2,247,961, made up of 234,732,882 common, valued at \$1,755,187, or an average value per thousand of \$7.48, and 49,817,160 pressed brick, valued at \$492,774, or an average value per thousand of \$9.89. In addition to the common and pressed brick there was a production of ornamental brick of 1,008,567, valued at \$49,097, and a production of fireproofing brick, valued at \$253,401.

In 1914 the total sales were 551,148,620, valued at \$4,769,417, made up of 457,513,762 common, valued at \$3,653,861, or an average value per thousand of \$7.99, and 93,634,858 pressed brick, valued at \$1,115,556, or an average value per thousand of \$11.91. In addition to the common and pressed brick there was a production of ornamental brick of 1,554,496, valued at \$23,592, and a production of fireproofing brick and architectural terra-cotta, valued at \$405,543.

In 1913 the total sales were 785,228,728 brick, valued at \$7,376,106, made up of 668,426,675 common, valued at \$5,917,373, or an average value per thousand of \$8.85; and 116,802,053 pressed brick, valued at \$1,458,733, or an average value per thousand of \$12.49. In addition to the common and pressed brick there were sales of ornamental brick of 875,355, valued at \$15,423, and of fireproofing brick and architectural terra-cotta, valued at \$461,387.

Sales of Clay Building Brick (Common and Pressed) 1914 and 1915.

Province.	1914.				1915.			
	No. of active firms reporting.	No. sold.	Value.	Per cent of total value.	No. of active firms reporting.	No. sold.	Value.	Per cent of total value.
Nova Scotia.....	11	12,672,826	\$ 99,012	2.1	11	6,562,000	\$ 50,184	2.23
New Brunswick..	8	6,133,528	66,292	1.4	5	3,715,000	35,030	1.56
Quebec.....	45	126,818,949	1,010,861	21.2	33	83,735,065	628,851	27.97
Ontario.....	282	322,049,709	2,741,120	57.5	245	167,481,848	1,308,767	58.22
Manitoba.....	13	29,035,950	317,488	6.7	12	8,630,411	87,194	3.88
Saskatchewan....	14	8,715,000	93,699	1.9	13	4,607,045	43,601	1.94
Alberta.....	26	30,169,757	278,054	5.8	13	5,094,301	45,649	2.03
British Columbia.	20	15,552,901	162,891	3.4	17	4,724,372	48,685	2.17
Total.....	419	551,148,620	4,769,417	100.0	349	284,550,042	2,247,961	100.00

Sales of Clay Building Brick (Common and Pressed) 1912 and 1913.

Province.	1912.			1913.		
	No. sold.	Value.	Per cent of total value.	No. sold.	Value.	Per cent of total value.
Nova Scotia.....	18,822,960	\$ 130,108	1.5	22,085,765	\$ 174,024	2.3
New Brunswick.....	5,780,000	53,350	0.6	6,189,152	61,969	0.8
Quebec.....	173,336,557	1,446,880	16.8	153,696,242	1,250,765	17.0
Ontario.....	423,670,184	3,807,195	44.2	430,029,531	4,026,029	54.6
Manitoba.....	87,178,937	1,012,801	11.7	43,660,320	514,358	7.0
Saskatchewan.....	30,538,771	332,943	3.9	18,175,000	189,820	2.6
Alberta.....	93,759,980	1,105,912	12.8	71,996,343	732,408	9.9
British Columbia.....	61,284,565	731,040	8.5	39,396,375	426,733	5.8
Total.....	894,371,954	8,620,229	100.0	785,228,728	7,376,106	100.0

Very large stocks of brick were reported as being in manufacturers' hands at the close of 1914, the total number being 242,106,000 brick or equivalent to about 44 per cent of the year's sales. Stocks at the end of 1915 had been reduced to 147,817,000, but were still equivalent to 52 per cent of the year's sales.

The record of stocks on hand by provinces is shown in the following table:—

Common and Pressed Brick held in Stock by Manufacturers, December 31, 1914 and 1915.

Province.	1914.			1915.		
	Common brick. M.	Pressed brick. M.	Total M.	Common brick. M.	Pressed brick. M.	Total M.
Nova Scotia.....	4,690	50	4,740	500	.....	500
New Brunswick.....	2,830	100	2,930	700	42	742
Quebec.....	42,494	2,851	45,345	26,826	2,589	29,415
Ontario.....	107,325	23,369	130,694	65,202	13,044	78,246
Manitoba.....	20,140	760	20,900	14,800	190	14,990
Saskatchewan.....	7,503	1,140	8,643	5,088	540	5,628
Alberta.....	10,483	8,549	19,032	8,375	3,750	12,125
British Columbia.....	8,264	1,558	9,822	6,020	151	6,171
Total.....	203,729	38,377	242,106	127,511	20,306	147,817

The exports of building brick since 1891, and the imports since 1880, are shown in the following tables. The exports have never been large, averaging for a number of years about \$6,000 per annum. The exports fell off somewhat from 1909 to 1911, but increased again to a value of \$11,871 in 1914, and \$9,089 in 1915.

The annual imports for a number of years previous to 1903 averaged only about \$20,000 in value; during the past ten years, however, the imports have rapidly increased from \$100,000 to over \$760,000 in 1912. During

the calendar year 1915, the imports were 10,168,000 brick, valued at \$114,958, of which 375,000, valued at \$4,592, or an average of \$12.24 per thousand, were imported from Great Britain, and 9,793,000, valued at \$110,366, or an average of \$11.27 per thousand from the United States. The imports during the calendar year 1914 were 30,022,000 brick, valued at \$353,353, of which 1,794,000, valued at \$20,505, or an average of \$11.43 per thousand, were imported from Great Britain, and 28,228,000, valued at \$332,848, or an average of \$11.79 per thousand, from the United States.

Exports of Building Brick.

Calendar Year.	M.	Value.	Calendar Year.	M.	Value.	Calendar Year.	M.	Value.
1891.....	246	\$ 1,163	1899.....	172	\$ 1,351	1907.....	802	\$ 6,193
1892.....	1,963	12,192	1900.....	546	4,528	1908.....	2,344	9,047
1893.....	6,073	44,110	1901.....	646	5,189	1909.....	365	2,255
1894.....	1,095	7,405	1902.....	2,110	12,786	1910.....	390	2,762
1895.....	1,655	8,665	1903.....	891	5,699	1911.....	394	3,977
1896.....	983	5,678	1904.....	696	5,357	1912.....	694	8,493
1897.....	573	2,679	1905.....	754	5,888	1913.....	977	8,579
1898.....	65	442	1906.....	697	6,541	1914.....	1,486	11,871
						1915.....	1,155	9,089

Imports of Building Brick.

Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.	Fiscal Year.	M.	Value.
1880.....	340	\$ 2,067	1892.....	621	\$ 5,075	1904.....	13,455	\$117,468
1881.....	415	4,281	1893.....	1,489	14,108	1905.....	25,515	168,122
1882.....	3,500	24,572	1894.....	2,220	18,320	1906.....	21,934	194,897
1883.....	1,448	14,234	1895.....	575	4,705	Calendar Year.		
1884.....	3,263	20,258	1896.....	1,057	23,189	1907.....	12,961	129,235
1885.....	3,108	14,632	1897.....	2,094	10,336	1908.....	14,931	110,981
1886.....	983	5,929	1898.....	639	6,652	1909.....	27,972	195,360
1887.....	276	2,440	1899.....	2,611	21,306	1910.....	29,049	274,482
1888.....	2,483	20,720	1900.....	1,792	19,305	1911.....	51,102	475,865
1889.....	2,590	24,585	1901.....	2,800	20,677	1912.....	81,425	763,470
1890.....	1,933	12,500	1902.....	4,087	33,802	1913.....	56,846	575,269
1891.....	589	9,744	1903.....	2,881	28,493	1914.....	30,022	353,353
						1915.....	10,168	114,958

Prices.—The price of brick varies greatly with the quality, locality, market or demand. The values as given in the table of production are those at the yard or kiln and do not include costs of delivery. They do not, therefore, represent the price to the consumer. The average price of common brick at the kiln in 1915 according to these returns was \$7.48, as compared with \$7.99 in 1914, \$8.85 in 1913, and \$9.11 in 1912; and of pressed brick \$9.89 in 1915, as compared with \$11.91 in 1914, \$12.49 in 1913, and \$12.86 in 1912.

In the Maritime Provinces during 1915 the price of common brick varied from \$7.00 to \$11.00, averaging for Nova Scotia \$7.53, and for New Brunswick \$9.29.

In Quebec the price of common brick varied between \$5 and \$8, averaging \$7.10, while the price of pressed brick averaged \$15.73. The average price of common brick in Ontario was \$7.34, the limits of variation being \$6, and \$10, while for pressed brick the average was \$9.16, and the variation from \$7 to \$12.

In all the western provinces common brick ranged from about \$8 to \$11.50, averaging \$10.10 in Manitoba, \$8.72 in Saskatchewan, \$8.63 in Alberta, and \$9.23 in British Columbia. Pressed brick ranged from \$10.50 to \$22.50 in individual yards, averaging \$16.82 in Saskatchewan, \$9.88 in Alberta, and \$21.41 in British Columbia.

The following table shows the average values at the kilns, of common and pressed brick, during 1913, 1914, and 1915, as furnished by the producers.

Average Prices per Thousand of Common and Pressed Brick.

	Common brick.			Pressed brick.		
	1913.	1914.	1915.	1913.	1914.	1915.
Nova Scotia.....	\$ 7.82	\$ 7.75	\$ 7.53	\$16.06	\$15.32	\$15.00
New Brunswick.....	10.00	10.61	9.29	12.00	22.50	22.00
Quebec.....	7.89	7.40	7.10	12.73	15.91	15.73
Ontario.....	8.88	7.86	7.34	11.48	10.77	9.16
Manitoba.....	11.21	10.79	10.10	17.28	12.59	.....
Saskatchewan.....	9.86	8.98	8.72	16.15	17.31	16.82
Alberta.....	9.13	7.92	8.63	12.97	13.52	9.88
British Columbia.....	9.49	8.56	9.23	25.65	26.50	21.41
Canada.....	8.85	7.99	7.48	12.49	11.91	9.89

PRODUCTION OF BRICK BY PROVINCES.

Nova Scotia and New Brunswick.—The total sales in Nova Scotia were 6,562,000 brick, valued at \$50,184, as compared with sales of 12,672,826 brick valued at \$99,012 in 1914. The chief sources of production are: Annapolis Royal, Pugwash, Elmsdale, Amherst, Orangedale, and New Glasgow.

The total sales in New Brunswick were 3,715,000 brick, valued at \$35,030, as compared with 6,133,528 brick, valued at \$66,292 in 1914; and the principal sources of production are Fredericton, St. John, Chatham, and Lewisville.

Quebec.—The total sales of brick in Quebec in 1915 were 83,735,065, valued at \$628,851, comprising 70,744,548 common brick, valued at \$566,085 or \$7.10 per thousand, and 3,990,517 pressed brick, valued at \$62,766, or \$15.73 per thousand.

The sales in 1914 were 126,818,949, valued at \$1,101,861, comprising 118,278,889 common brick, valued at \$874,961, or \$7.40 per thousand, and 8,540,060 pressed brick, valued at \$135,900, or \$15.91 per thousand.

While brick-making is carried on at many places in the Province, the principal plants are located at Montreal, Laprairie, Sherbrooke, Quebec, and Deschailions.

Ontario.—This Province is credited in 1915 with over 58 per cent of the brick production of Canada, the total sales as reported by 245 firms being 167,481,848 brick, valued at \$1,308,767, and including 123,977,112 common brick, valued at \$910,459, or an average of \$7.34 per thousand, and 43,504,736 pressed brick valued at \$398,308, or an average of \$9.16 per thousand.

The total sales in 1914 were 322,049,709 brick, valued at \$2,741,120, and included 249,896,642 common brick, valued at \$1,963,921, or an average of \$7.86 per thousand, and 72,153,067 pressed brick, valued at \$777,199, or an average of \$10.77 per thousand.

The city of Toronto and vicinity, including the counties of York, Peel and Halton, is the principal brick-making section, and in 1915 produced about 56 per cent of the Ontario production, or about 33 per cent of the total Canadian production of brick. The county of Wentworth, comprising the city of Hamilton and vicinity, produced over 11 per cent of the Ontario production. The Ottawa district, including the counties of Russell and Carleton, produced over 6 per cent.

The greater part of the pressed brick reported as such was made in the Toronto and Hamilton districts.

The production by principal counties in 1915 and 1914 is shown in the accompanying tables:—

Sale of Common and Pressed Brick in Ontario by Principal Counties, 1915.

County.	Common.			Pressed.			Total value.	Per cent.
	No.	Value.	Per M.	No.	Value.	Per M.		
York.....	48,656,434	\$336,701	\$6.92	2,708,600	\$ 37,379	\$13.80	\$374,080	28.56
Halton.....	.....	.....	.....	25,176,560	214,251	8.51	214,251	16.37
Wentworth.....	15,439,140	92,856	6.01	5,679,873	52,356	9.22	145,212	11.10
Peel.....	11,296,120	98,393	8.71	5,426,438	48,095	8.86	146,488	11.19
Carleton.....	6,028,000	47,667	7.91	.....	.....	.....	47,667	3.64
Russell.....	3,200,000	23,400	7.31	1,000,000	12,000	12.00	35,400	2.70
Kent.....	3,864,300	27,973	7.24	.....	.....	.....	27,973	2.14
Grey.....	1,614,000	11,197	6.94	120,000	1,080	9.00	12,277	0.94
Middlesex.....	4,935,500	38,434	7.79	800,000	8,000	10.00	46,434	3.55
Renfrew.....	2,516,000	20,853	8.29	.....	.....	.....	20,853	1.59
Essex.....	2,693,000	19,705	7.32	.....	.....	.....	19,705	1.51
Thunder Bay Dist.....	1,010,500	11,925	11.80	.....	.....	.....	11,925	0.91
Total, 12 counties.....	101,252,994	729,104	7.20	40,911,471	373,161	9.12	1,102,265	84.22
Total, other counties.....	22,724,118	181,355	7.98	2,593,265	25,147	9.70	206,502	15.78
Total, Ontario.....	123,977,112	910,459	7.34	43,504,736	398,308	9.16	1,308,767	100.00

Sale of Common and Pressed Brick in Ontario by Principal Counties, 1914.

County.	Common.			Pressed.			Total value.	Per cent.
	No.	Value.	Per M.	No.	Value.	Per M.		
York.....	100,565,314	\$ 807,673	\$ 8.03	4,979,600	\$ 72,192	\$14.50	\$ 879,865	32.10
Peel.....	39,981,156	278,242	6.96	14,566,450	152,435	10.47	430,677	15.71
Halton.....	.....	.....	.....	40,404,037	424,627	10.51	424,627	15.49
Wentworth.....	18,846,955	117,896	6.26	4,329,240	39,059	9.02	156,955	5.73
Carleton.....	10,027,000	95,908	9.56	.....	.....	.....	95,908	3.50
Russell.....	11,574,000	79,295	6.85	1,355,079	15,702	11.59	94,997	3.47
Thunder Bay District...	5,049,176	46,696	9.25	2,395,873	31,056	12.96	77,752	2.84
Middlesex.....	6,678,511	56,743	8.50	1,750,000	19,800	11.31	76,543	2.79
Kent.....	6,498,600	51,074	7.86	.....	.....	.....	51,074	1.86
Waterloo.....	5,340,321	37,719	7.06	.....	.....	.....	37,719	1.38
Lincoln.....	2,522,325	22,956	9.10	734,788	8,450	11.50	31,406	1.14
Peterboro.....	3,000,000	30,000	10.00	.....	.....	.....	30,000	1.09
Simcoe.....	3,150,000	26,313	8.35	.....	.....	.....	26,313	0.96
Renfrew.....	2,503,775	22,595	9.02	.....	.....	.....	22,595	0.82
Essex.....	2,688,000	18,863	7.02	.....	.....	.....	18,863	0.69
Nipissing.....	2,050,000	18,850	9.20	.....	.....	.....	18,850	0.69
Grey.....	2,094,283	16,748	8.00	.....	.....	.....	16,748	0.61
Total, 17 counties.....	222,569,416	1,727,571	7.76	70,515,067	763,321	10.82	2,490,892	90.87
Total, other counties....	27,327,226	236,350	8.65	1,638,000	13,878	8.47	250,228	9.13
Total, Ontario.....	249,896,642	1,963,921	7.86	72,153,067	777,199	10.77	2,741,120	100.00

The annual production of common and pressed brick as ascertained by the Ontario Bureau of Mines, is shown in the following table. The figures differ only slightly from those reported directly to the Mines Branch.

Building Brick Made in Ontario Since 1898.

(As ascertained by the Ontario Bureau of Mines.)

	Common brick.			Pressed brick.		
	M.	Value.	Average per M.	M.	Value.	Average per M.
1898.....	170,000	\$ 914,000	\$5.376	8,970	\$100,344	\$11.187
1899.....	233,898	1,313,750	5.617	10,808	105,000	9.715
1900.....	240,430	1,379,590	5.738	11,562	114,419	9.896
1901.....	259,265	1,530,460	5.903	12,846	104,394	8.127
1902.....	220,500	1,411,000	6.399	19,755	144,171	7.298
1903.....	230,000	1,561,700	6.790	23,703	218,550	9.220
1904.....	200,000	1,430,000	7.150	26,857	226,750	8.443
1905.....	250,000	1,937,500	7.750	26,000	234,000	9.000
1906.....	300,000	2,157,000	7.190	39,860	337,795	8.475
1907.....	273,882	2,109,978	7.704	69,763	648,683	9.298
1908.....	222,361	1,575,875	7.087	56,167	485,819	8.649
1909.....	246,308	1,916,147	7.779	53,167	490,571	9.227
1910.....	304,988	2,374,287	7.785	44,204	458,596	10.375
1911.....	354,546	2,801,971	7.903	52,764	564,630	10.701
1912.....	385,000	3,178,250	8.255	65,598	634,169	9.667
1913.....	408,808	3,452,352	8.445	81,238	919,741	11.321
1914.....	294,400	2,336,207	7.935	61,934	656,944	10.607
1915*.....	96,517	768,517	7.959	24,836	217,350	8.751

* Preliminary.

In addition to the ordinary clay-building brick, there were produced in this Province in 1915, ornamental brick valued at \$12,140, and fire-proofing valued at \$41,040. In 1914 the production of ornamental brick was valued at \$15,504, and of fireproofing and terra-cotta \$205,204.

Manitoba.—Throughout all of the western provinces there was again a large falling off in the demand for brick. In Manitoba the total sales were 8,630,411, valued at \$87,194, as compared with sales in 1914 of 29,035,950, valued at \$317,488. Stocks on hand at the end of December exceeded its year's sales.

The principal brick-making plants are at Winnipeg, St. Boniface, Lac du Bonnet, Portage la Prairie, Sidney, Gilbert Plains, Balmoral, and Neepawa.

Saskatchewan.—The total sales of clay-building brick in Saskatchewan in 1915 were 4,607,045, valued at \$43,601, as against sales in 1914 of 8,715,000, valued at \$93,699. Stocks on hand at the end of 1915 were 5,628,000, also in excess of the year's sales.

The principal clay plants are located at Estevan, Shand, Arcola, Clay Bank, Prince Albert, Bruno, Weyburn, Saskatoon, Rosthern, Verigin, and Broadview.

Alberta.—The total sales of clay-building brick in 1915 were 5,094,301, valued at \$45,649, as compared with sales in 1914 of 30,169,757, valued at \$278,054, and stocks on hand at the end of 1915 amounted to 12,125,000 brick, or over double the year's sales.

The principal centres of production are: Edmonton, Cochrane, Calgary, Medicine Hat, Redcliff, Lethbridge, Red Deer, Sandstone, Brickburn, and Innisfail.

In addition to ordinary building-brick there was a production of fire-proofing brick, valued at \$30,263.

British Columbia.—The total sales of brick in this Province in 1915 were reported as 4,724,372, valued at \$48,685, as against sales in 1914 of 15,552,901, valued at \$162,891, while stocks on hand at the end of the year were 6,171,000 brick.

In addition to the building-brick there was also a production of fire-proofing brick valued at \$24,983, as against a value of \$58,077 in 1914.

The principal centres of brick manufacture are: Vancouver, New Westminster, Clayburn, Kilgard, Port Haney and vicinity, Gabriola Island, Victoria, Sydney, and Kelowna.

CLAY-PAVING BRICK.

The total production of paving brick and paving blocks in Canada in 1915 was reported as 1,227,647, valued at \$20,694, or an average value per thousand of \$16.85, as compared with 2,707,000, valued at \$49,627, or an average value per thousand in 1914 of \$18.33.

This paving brick is made chiefly at West Toronto, Ontario, from shale obtained from the banks of the Humber river, although during the past

two years there has also been a small production reported from Clayburn, British Columbia.

The annual production has for a number of years varied from 3,000,000 to over 5,000,000 per season; and the Ontario output finds a market chiefly in Toronto.

Statistics of production since 1887 are shown in the next table.

The imports of paving brick during the past five years have considerably exceeded the domestic production. During the calendar year 1915 the imports were: 5,865,000, valued at \$76,759, or an average value per thousand of \$13.09, and included 4,747,000, valued at \$61,468, or an average of \$12.95, from the United States, and 1,118,000, valued at \$15,291, or an average of \$13.68 from Great Britain.

The total imports during the calendar year 1914 were 9,069,000, valued at \$145,063, or an average value per thousand of \$16.00, and included 6,395,000, valued at \$103,900, or an average of \$16.25 from the United States, and 2,674,000, valued at \$41,163, or an average of \$15.21 from Great Britain.

Annual Production of Paving Brick.*

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average per M.
1897.....	4,568	\$45,670	\$10.00	1906.....	3,000	\$45,000	\$15.00
1898.....	.....	.....	.....	1907.....	3,618	72,354	20.00
1899.....	5,300	42,550	8.03	1908.....	3,720	59,456	15.98
1900.....	2,710	26,950	9.94	1909.....	3,760	67,408	17.93
1901.....	3,689	37,000	10.03	1910.....	4,215	78,980	18.74
1902.....	4,211	42,000	9.97	1911.....	5,220	79,444	15.22
1903.....	3,789	45,288	11.95	1912.....	4,580	85,989	18.78
1904.....	4,436	55,450	12.50	1913.....	4,208	75,669	17.98
1905.....	4,500	54,000	12.00	1914.....	2,707	49,627	18.33
				1915.....	1,228	20,694	16.85

* Figures previous to 1907 compiled from Ontario Bureau of Mines.

Imports of Paving Brick.

Year.	M.	Value.	Average per M.	Year.	M.	Value.	Average per M.
Fiscal Year.				Calendar Year.			
1895.....	275	\$ 5,006	\$18.20	1907.....	5,438	\$ 62,570	\$11.51
1896.....	918	10,132	11.04	1908.....	.....	100,013	.....
1897.....	52	719	13.83	1909.....	.....	139,366	.....
1898.....	367	2,337	6.37	1910.....	10,503	124,994	11.90
1899.....	1,583	23,648	14.94	1911.....	11,450	164,292	14.34
1899.....	2,175	35,644	16.39	1912.....	11,793	160,663	13.62
1900.....	900	10,414	11.57	1913.....	13,035	176,497	13.54
1901.....	1,030	16,788	16.30	1914.....	9,069	145,063	16.00
1902.....	1,337	18,811	14.07	1915.....	5,865	76,759	13.09
1903.....	1,986	29,753	14.98				
1904.....	3,350	32,578	13.86				
1905.....	4,104	46,008	11.21				
1906.....							

FIRECLAY AND FIRECLAY PRODUCTS.

There are a number of clays from different parts of Canada that have been used in the manufacture of refractory brick or firebrick, and for furnace linings, etc., which have been usually termed "fireclays." These include clays found with the coal measures at Westville, N. S., and at Comox, V. I., also clays found at Claybank, south of Moosejaw, Sask., at Clayburn, near the city of Vancouver, B.C., and at Kilgard, B.C. Stove linings and other refractory clay products are made at several places in Ontario and Quebec from imported clays.

The total value of the sales of fireclays, firebrick, and fireclay products in 1915 was \$110,693, as compared with a valuation of \$107,568 in 1914 and \$142,738 in 1913. There was, in addition, in 1915, a production of fireclay products valued at \$28,807, reported as being made from imported clays.

The production in 1915 included fireclay or refractory clay sold as such, 2,328 tons, valued at \$12,065; firebrick 2,895,640, valued at \$68,700, or an average of \$23.73 per thousand; and other fireclay products valued at \$29,928.

The production in 1914 included fireclay or refractory clay, sold as such, 2,171 tons, valued at \$12,875; firebrick 2,815,690, valued at \$72,299 or an average of \$25.67 per thousand; and other fireclay products valued at \$22,394.

The imports of firebrick during the calendar year 1915 were valued at \$813,071, of which \$718,299 was from the United States, \$93,926 from Great Britain, and \$846 from other countries.

The imports of firebrick during the calendar year 1914 were valued at \$690,133, of which \$592,650 was from the United States, \$93,837 from Great Britain, and \$3,646 from other countries.

Fireclay was imported during the calendar year 1915, to the value of \$87,267, as compared with a value of \$90,233 in 1914, and \$143,399 in 1913.

Statistics of the annual production since 1907 of firebrick, refractory clay or fireclay, sold as such, and of fireclay products; and statistics of the imports of firebrick and fireclay are shown in the following tables:—

Production of Fireclay and Fireclay Products.

Year.	Firebrick.			Fireclay.			Other fireclay products.	Total value.
	No. sold.	Value.	Per M.	Tons.	Value.	Per Ton.		
1907.....	4,323,179	\$113,322	\$26.21	.....	.....	.....	\$18,000	\$131,322
1908.....	2,415,871	70,429	29.16	1,984	\$ 8,121	\$4.09	31,752	110,302
1909.....	1,059,270	32,742	30.92	4,405	12,390	2.81	33,000	78,132
1910.....	1,375,400	21,352	21.34	1,425	5,863	4.11	15,000	50,215
1911.....	2,367,937	44,122	18.63	7,532	24,128	3.20	20,880	89,130
1912.....	3,429,594	67,192	19.59	6,307	24,343	3.86	34,050	125,585
1913.....	3,667,276	86,164	23.50	3,345	14,018	4.19	42,556	142,738
1914.....	2,815,690	72,299	25.67	2,171	12,875	5.93	22,394	107,568
1915.....	2,895,640	68,700	23.73	2,328	12,065	5.18	29,928	110,693

Imports of Firebrick and Fireclay.

Fiscal Year.	Fireclay.	Firebrick.	Calendar Year.	Fireclay.	Firebrick.
1900.....	\$ 59,291	\$ 39,535	1908.....	\$ 86,879	\$ 380,905
1901.....	79,530	32,831	1909.....	86,161	485,994
1902.....	64,541	45,608	1910.....	124,293	811,927
1903.....	94,509	34,522	1911.....	125,199	814,414
1904.....	52,716	38,335	1912.....	140,500	953,621
1905.....	73,837	44,746	1913.....	143,399	1,192,857
1906.....	131,130	51,892	1914.....	90,233	690,133
1907 Calendar Year.....	152,485	641,811	1915.....	87,267	813,071

SEWERPIPE AND DRAIN TILE.

The total value of the sales of sewerpipe in 1915 was \$799,446, as compared with a value of \$1,104,499 in 1914, \$1,035,906 in 1913, and \$884,641 in 1912. About 45 per cent of the production in 1915 was made in Ontario.

Following is a list of firms reporting production of sewerpipe in 1915:—

Standard Clay Products, Limited, St. Johns, Que., and New Glasgow, N.S.
 Ontario Sewerpipe Company, Mimico, Ont.
 Dominion Sewerpipe Company, Swansea, Ont.
 Hamilton & Toronto Sewerpipe Company, Hamilton, Ont.
 Alberta Clay Products Company, Medicine Hat, Alberta.
 Kilgard Fireclay Company, Kilgard, B.C.
 The Clayburn Company, Limited, Clayburn, B.C.
 British Columbia Pottery Company, Victoria, B.C.

The imports of drainpipe and sewerpipe during 1915 were valued at \$41,801, of which \$28,496 were imported from the United States, and \$13,305 from Great Britain.

The total imports during 1914 were valued at \$338,533, of which \$305,546 were imported from the United States; \$32,866 from Great Britain; and \$121 from other countries.

The total sales of drain tile in Canada in 1915 as reported to this Branch were valued at \$355,296, as compared with sales of \$366,340 in 1914, and \$338,552 in 1913. The greater part of this production is in the Province of Ontario; the sales in this Province in 1915 as reported to this

Branch were 18,812,712, valued at \$341,467, as against 18,592,254, valued at \$343,662 in 1914.

The Ontario Bureau of Mines reports the total number of drain tile made in that Province during 1915 as 15,488,000, valued at \$274,773, or an average of \$17.74 per thousand, as compared with 14,710,000, valued at \$277,530, or an average of \$18.87 per thousand in 1914.

The imports of unglazed tile are comparatively small, the value during the calendar year 1915 being \$346, as compared with \$2,941 in 1914, and \$12,156 in 1913.

Statistics of the annual production of sewerpipe and of the imports of drain tile and sewerpipe, are shown in the next three tables:—

Production of Sewerpipe.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1888.....	\$266,320	1897.....	\$164,250	1906.....	\$ 350,045
1889.....	Not available	1898.....	181,717	1907.....	667,100
1890.....	348,000	1899.....	161,546	1908.....	514,362
1891.....	227,300	1900.....	231,525	1909.....	645,722
1892.....	367,660	1901.....	248,115	1910.....	774,110
1893.....	350,000	1902.....	301,965	1911.....	812,716
1894.....	250,325	1903.....	317,970	1912.....	884,641
1895.....	257,045	1904.....	440,894	1913.....	1,035,906
1896.....	153,875	1905.....	382,000	1914.....	1,104,499
				1915.....	799,446

Production of Drain Tile in Ontario.

(As ascertained by the Ontario Bureau of Mines.)

Year.	No.	Value.	Year.	No.	Value.	Year.	No.	Value.
1891.....	7,500,000	\$ 90,000	1899..	21,027,400	\$240,246	1907..	15,578,000	\$250,154
1892.....	10,000,000	100,000	1900..	19,544,000	209,738	1908..	24,800,000	338,622
1893.....	17,300,000	190,000	1901..	21,592,000	231,374	1909..	27,418,000	363,555
1894.....	25,000,000	280,000	1902..	17,510,000	199,000	1910..	21,028,000	318,460
1895.....	14,330,000	157,000	1903..	18,200,000	227,000	1911..	21,630,000	349,558
1896.....	13,200,000	144,000	1904..	16,000,000	210,000	1912..	16,463,000	279,579
1897.....	*	*	1905..	15,000,000	220,000	1913..	16,935,000	292,767
1898.....	22,668,000	225,000	1906..	17,700,000	252,500	1914..	14,710,000	277,530
						1915..	15,488,000	274,773

* Not stated.

Imports of Drain Tile and Sewerpipe.

Fiscal Year.	Drain tile. (a)	Sewerpipe. (b)	Fiscal Year.	Drain tile. (a)	Sewerpipe. (b)
1880.....		\$33,796	1898.....	\$ 157	\$ 29,454
1881.....		37,368	1899.....	1,817	32,071
1882.....		70,061	1900.....	1,383	37,766
1883.....		70,699	1901.....	1,264	54,819
1884.....	\$5,585	66,170	1902.....	269	55,261
1885.....	2,911	66,678	1903.....	252	57,100
1886.....	1,905	56,048	1904.....	1,637	53,958
1887.....	2,183	69,020	1905.....	1,229	101,166
1888.....	4,290	96,967	1906.....	4,727	131,353
1889.....	2,346	80,869	Calendar Year.		
1890.....	3,780	73,654	1907.....	2,011	130,698
1891.....	673	86,522	1908.....	2,056	108,189
1892.....	473	59,064	1909.....	2,785	170,280
1893.....	110	38,891	1910.....	4,485	175,599
1894.....	53	24,572	1911.....	5,640	382,929
1895.....	695	20,358	1912.....	4,018	507,024
1896.....	339	18,957	1913.....	12,156	465,997
1897.....	416	33,870	1914.....	2,941	338,533
			1915.....	346	41,801

(a) Drain tile, not glazed.

(b) Drain pipes, sewerpipe, and earthenware fittings therefor, chimney linings, or vents, chimney tops and inverted blocks, glazed or unglazed.

POTTERY AND EARTHENWARE.

The pottery made from Canadian clays has been, hitherto, chiefly of the common grades, such as flowerpots, jardinières, crocks, jars, churns, etc. A number of potters made a higher grade product of stoneware, but the majority of these use imported clays. Sanitary ware is made at St. Johns, Que., and other points; but the raw material, including clays and feldspar, is nearly all imported.

The total value of the production of pottery and clay sanitary ware in 1915, according to returns received, was \$317,080, of which it is estimated that a value of \$252,180 is attributable to imported clays. The total value of the production in 1914 was \$312,846, of which a value of \$277,475 was credited to imported clays.

Annual statistics of production are shown herewith:—

Annual Production of Pottery.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1888.....	\$ 27,750	1897.....	\$129,629	1906.....	\$150,000
1889.....	Not available	1898.....	214,675	1907.....	253,809
1890.....	195,242	1899.....	185,000	1908.....	200,541
1891.....	258,844	1900.....	200,000	1909.....	285,285
1892.....	265,811	1901.....	200,000	1910.....	250,924
1893.....	213,186	1902.....	200,000	1911.....	102,493
1894.....	162,144	1903.....	200,000	1912.....	43,955
1895.....	151,588	1904.....	140,000	1913.....	53,533
1896.....	163,427	1905.....	120,000	1914.....	35,371
				1915.....	64,900

Details of the imports of earthenware and chinaware, showing the values imported and the countries of origin, have already been shown in the general table of imports.

The imports in 1915 were valued at \$1,460,010, as compared with a value of \$2,192,222 in 1914, and \$3,314,870 in 1913. These imports are subdivided into eight classes and in 1915 included: Brown or coloured earthenware, etc., \$74,864; C.C. or cream-coloured ware, decorated, printed, sponged, etc., \$135,425; demijohns, churns or crocks, \$14,752; tableware of china, porcelain, white granite, etc., \$1,016,900; china and porcelain ware, n.o.p., \$18,312; tiles or blocks of earthenware or stone prepared for mosaic flooring, \$40,286; earthenware tiles, n.o.p. \$92,700; manufactures of earthenware, n.o.p. \$66,771.

The imports in 1914 included: Brown or coloured earthenware, etc., \$71,083; C.C. or cream-coloured ware, decorated, printed, sponged, etc., \$163,431; demijohns, churns or crocks \$25,935; tableware of china, porcelain, white granite, etc., \$1,437,175; china and porcelain ware, n.o.p., \$30,006; tiles or blocks of earthenware or stone prepared for mosaic flooring, \$104,285, earthenware tiles, n.o.p., \$186,161; manufactures of earthenware, n.o.p., \$174,146.

It will be observed that there has been a large decrease in almost all classes of earthenware and chinaware imported in 1915. Great Britain is the principal source of the imports of this class of products, but quite large supplies are also obtained from the United States, Germany, France, Austria-Hungary, Japan, Belgium, and other countries.

Imports of Earthenware and Chinaware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880.....	\$322,333	1892.....	\$ 748,810	1904.....	\$1,611,356
1881.....	439,029	1893.....	709,737	1905.....	1,636,214
1882.....	646,734	1894.....	695,514	1906.....	1,692,359
1883.....	657,886	1895.....	547,935	1907 (9 mos.).....	1,422,880
1884.....	544,586	1896.....	575,493	1908.....	2,190,784
1885.....	511,853	1897.....	595,822	Calendar Year.	
1886.....	599,269	1898.....	675,874	1909.....	1,781,759
1887.....	750,691	1899.....	916,727	1910.....	2,283,116
1888.....	697,082	1900.....	959,526	1911.....	2,516,536
1889.....	697,949	1901.....	1,114,677	1912.....	3,094,956
1890.....	695,206	1902.....	1,275,093	1913.....	3,314,870
1891.....	634,907	1903.....	1,406,610	1914.....	2,192,222
				1915.....	1,460,010

KAOLIN.

The shipments of kaolin in 1915 were 1,300 tons, valued at \$13,000, as compared with 1,000 tons valued at \$10,000 in 1914; 500 tons valued at \$5,000 in 1913, and 20 tons valued at \$160 in 1912.

The production was obtained from the deposits in the township of Amherst, Ottawa county, Quebec, which have been opened up by the Canadian China Clay Company of Montreal.

The plant for refining the clay is situated 2 miles from St. Remi d'Amherst, and 7 miles from Huberdeau, the terminus of the Montefort Branch of the Canadian Northern Quebec railway—46 miles northwest of Montreal.

The imports of china-clay ground and unground, into Canada during the twelve months ending December, 1915, were 21,940 tons, valued at \$124,658, or \$5.68 per ton, as against imports of 20,437 tons, valued at \$150,881, or \$7.38 per ton in 1914.

The imports of earthenware and chinaware, as already noted, were valued at \$1,460,010 in 1915, \$2,192,222 in 1914, and \$3,314,870 in 1913, and consist chiefly of tableware of china, porcelain, etc.

Kaolin, or china-clay is also in considerable demand in the United States, the imports into that country in 1915 being 186,414 gross tons valued at \$1,151,551, as compared with 288,858 gross tons, valued at \$1,908,407, imported in 1914.

Annual Imports of China-Clay.

Calendar Year.	Tons.	Value.	Value per ton.
1907.....	13,242	\$102,209	\$7.72
1908.....	10,781	87,984	8.16
1909.....	12,791	100,066	7.82
1910.....	18,216	142,125	7.80
1911.....	18,819	125,768	6.68
1912.....	18,332	127,402	6.95
1913.....	21,164	149,337	7.06
1914.....	20,437	150,881	7.38
1915.....	21,940	124,658	5.68

LIME.

The production of lime which in 1915 amounted to 5,047,244 bushels (equivalent to about 176,654 tons), valued at \$1,015,702, or an average of 20 cents per bushel or \$5.75 per ton, is the lowest since 1908, and was exceeded even in 1906. Compared with 1914 when the production was 7,028,582 bushels (equivalent to 246,000 tons), valued at \$1,360,628, an average of 19 cents per bushel, or \$5.53 per ton, a decrease is shown of 1,981,338 bushels or 28 per cent.

The production in 1913 was reported as 7,558,484 bushels, (264,547 tons), valued at \$1,609,398, or an average of 21 cents per bushel, or \$6.08 per ton.

Returns were received from 78 firms in 1915, as compared with 85 firms in 1914. The average number of men employed in 1915 was 633, and wages paid \$293,735, as against 1,015 men employed and \$518,331 paid in wages in 1914. Statistics in respect to labour and wages in lime production, however, should be used with some discrimination, as many firms producing lime are also engaged in the quarrying of stone for purposes other than lime-burning, and are unable to make separate reports as to labour employed. This is particularly evident in the record from Nova Scotia and New Brunswick, since, for the first mentioned, the record includes only the labour employed at the kilns, while, for the latter, quarry costs are also included.

The average price per bushel of lime sold in 1915 varied from a minimum $17\frac{1}{2}$ cents in Ontario to a maximum of $32\frac{3}{4}$ cents in British Columbia.

Nearly 88 per cent of the total production in 1915 was derived from Ontario, Quebec, and the Maritime Provinces, as against 85 per cent of the total from these provinces in 1914, and 72 per cent in 1912, showing that the rate of decrease in production has been greater in the west than in the east.

Production of hydrated lime amounting to a total of 7,972 tons was reported by six firms, viz.: The Standard Lime Co., Ltd., Joliette, Que., Wright & Co., Incorporated, Hull, Que., The Standard White Lime Co., of Guelph, Ont., The Elora White Lime Co., Ltd., Elora, Ont., The Contractors Supply Co., Ltd., Orangeville, Ont., and the Ontario Reformatory at Guelph, at which plant there was also a production of 550 tons of "Alca."

"Alca" lime is a product made by the incorporation with selected hydrated lime of about 15 per cent of a patented calcium aluminate compound which is derived as a slag from a blast furnace and which has a composition of about 25 to 35 per cent alumina, 20 per cent silica, and 35 to 40 per cent lime and magnesia.

Lime Production by Provinces, 1915.

Province.	No. of active firms reporting.	Men employed.	Wages paid.	SALES.			
				Bushels.	Value.	Average per bushel.	Per cent of total value.
Nova Scotia.....	1	10	\$ 4,802	915,086	\$ 183,017	\$0.200	18.02
New Brunswick.....	5	77	39,572	369,117	93,797	0.254	9.23
Quebec.....	20	209	100,449	1,351,306	274,831	0.203	27.06
Ontario.....	40	240	97,298	1,903,914	328,515	0.173	32.34
Manitoba.....	5	55	27,948	281,432	71,372	0.254	7.03
Alberta.....	4	22	8,288	74,152	14,445	0.195	1.42
British Columbia....	3	20	15,378	152,237	49,725	0.327	4.90
Total.....	78	633	293,735	5,047,244	1,015,702	0.201	100.00

Lime Production by Provinces, 1914.

Province	No. of active firms reporting.	Men employed.	Wages paid.	SALES.			
				Bushels.	Value.	Average per bushel.	Per cent of total value.
P. E. Island.....	1	2	\$ 61	1,693	\$ 542	\$0.32	0.04
Nova Scotia.....	1	15	6,900	516,029	103,206	0.20	7.59
New Brunswick.....	5	89	47,224	391,739	102,980	0.26	7.57
Quebec.....	18	258	137,640	1,767,935	389,064	0.22	28.59
Ontario.....	43	429	224,937	3,393,078	556,850	0.16	40.92
Manitoba.....	7	123	47,331	526,167	92,898	0.18	6.83
Alberta.....	6	58	25,963	280,252	58,321	0.21	4.29
British Columbia....	4	41	28,275	151,689	56,767	0.37	4.17
Total.....	85	1,015	518,331	7,028,582	1,360,628	0.19	100.00

Lime Production by Provinces, 1913.

Province.	No. of active firms reporting.	Men employed.	Wages paid.	SALES.			
				Bushels.	Value.	Average per bushel.	Per cent of total value.
P. E. Island.....	1	2	\$ 130	3,762	\$ 1,129	\$0.30	{ 10.65
Nova Scotia.....	1	10	5,199	851,050	170,210	0.20	
New Brunswick.....	5	93	50,180	392,985	98,841	0.25	6.14
Quebec.....	17	321	162,422	1,616,446	418,008	0.26	25.97
Ontario.....	39	410	239,143	3,254,482	573,209	0.18	35.62
Manitoba.....	5	42	21,640	576,938	107,281	0.19	6.66
Saskatchewan.....	1	8	3,000	35,000	10,000	0.29	0.62
Alberta.....	6	70	50,127	465,250	115,355	0.25	7.17
British Columbia....	2	120	46,000	362,571	115,365	0.32	7.17
Total.....	77	1,076	577,841	7,558,484	1,609,398	0.21	100.00

Annual Production of Lime by Provinces.

Year.	NOVA SCOTIA.			P. E. ISLAND.			NEW BRUNSWICK.			QUEBEC.			ONTARIO		
	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.
1906.....	50,000	\$ 13,600	\$0.27	.....	.....	.....	405,450	\$ 94,290	\$0.23	923,563	\$201,816	\$0.22	2,885,000	\$496,785	\$0.17
1907.....	30,000	11,100	0.37	.....	\$4,900	\$0.33	554,330	124,786	0.23	1,053,856	262,990	0.25	2,333,879	393,474	0.17
1908.....	37,500	12,000	0.32	13,568	4,102	0.30	155,748	34,262	0.22	857,700	201,357	0.23	2,037,731	358,507	0.17
1909.....	37,500	11,250	0.30	20,230	5,479	0.27	697,466	154,151	0.22	1,281,827	315,633	0.25	2,619,553	434,147	0.17
1910.....	40,000	8,800	0.22	15,750	4,690	0.30	470,050	105,593	0.22	1,227,555	299,126	0.23	2,988,020	476,137	0.16
1911.....	68,930	123,790	0.20	20,250	6,765	0.33	613,728	132,897	0.22	1,428,392	356,453	0.25	3,360,265	538,902	0.16
1912.....	64,625	136,930	0.20	24,971	8,191	0.33	616,835	133,742	0.22	1,727,614	474,595	0.27	3,376,193	573,269	0.17
1913.....	831,050	170,210	0.20	3,762	1,129	0.30	392,985	98,841	0.25	1,616,446	418,008	0.26	3,254,482	573,209	0.18
1914.....	516,029	103,206	0.20	.....	.....	.....	391,739	102,980	0.26	1,767,935	389,064	0.22	3,393,078	556,850	0.16
1915.....	915,086	183,017	0.20	.....	.....	.....	369,117	93,797	0.25	1,351,306	274,831	0.20	1,903,914	328,515	0.17

Year.	MANITOBA.			SASKATCHEWAN.			ALBERTA.			B. COLUMBIA.			CANADA.		
	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.	Bushels.	Value.	Average.
1906.....	620,201	119,792	0.19	.....	.....	.....	240,000	56,200	0.23	106,192	26,694	0.25	5,230,406	1,009,177	0.19
1907.....	431,548	84,793	0.20	.....	1,480	0.40	173,040	41,225	0.24	159,963	49,847	0.31	4,755,316	974,595	0.20
1908.....	138,786	24,192	0.17	.....	.....	.....	135,000	34,500	0.26	176,435	44,027	0.25	3,601,468	712,947	0.20
1909.....	423,954	69,670	0.16	.....	.....	.....	281,125	67,350	0.24	231,269	75,076	0.32	5,592,924	1,132,756	0.20
1910.....	606,679	100,808	0.17	.....	.....	.....	303,214	69,268	0.23	196,878	72,657	0.37	5,848,146	1,137,079	0.19
1911.....	706,888	140,629	0.20	.....	.....	.....	434,038	100,407	0.23	351,014	117,756	0.34	7,533,525	1,517,599	0.20
1912.....	818,237	168,257	0.21	4,000	1,440	0.36	704,035	166,520	0.24	517,329	181,905	0.35	8,475,839	1,844,849	0.22
1913.....	576,938	107,281	0.19	35,000	10,000	0.29	465,250	115,355	0.25	362,571	115,365	0.32	7,558,484	1,609,398	0.21
1914.....	526,167	92,898	0.18	.....	.....	.....	280,252	58,321	0.21	151,689	56,767	0.37	7,028,582	1,360,628	0.19
1915.....	281,432	71,372	0.25	.....	.....	.....	74,152	14,445	0.20	152,237	49,725	0.33	5,047,244	1,015,702	0.20

Exports and Imports.—The value of the lime exported during the calendar year 1915 was \$15,617, the destination being mainly the United States. In 1914 the exports were valued at \$16,927. The imports of lime during the calendar year 1915 were 189,774 barrels (18,977 tons), valued at \$98,040, or an average of 52 cents per barrel, or \$5.17 per ton, and were derived chiefly from the United States. The imports during 1914 were 340,828 barrels (34,083 tons), valued at \$211,123, or an average of 62 cents per barrel, or \$6.16 per ton.

Annual statistics of exports and imports are given in the next two tables.

Exports of Lime.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
1891.....	\$119,853	1899.....	\$ 73,565	1907.....	\$55,903
1892.....	121,535	1900.....	80,852	1908.....	43,316
1893.....	86,623	1901.....	99,194	1909.....	48,821
1894.....	83,670	1902.....	116,009	1910.....	44,762
1895.....	71,697	1903.....	131,412	1911.....	39,536
1896.....	70,820	1904.....	73,838	1912.....	35,097
1897.....	53,177	1905.....	85,723	1913.....	29,234
1898.....	49,594	1906.....	57,072	1914.....	16,927
				1915.....	15,617

Imports of Lime.

Year.	Barrels.	Value.	Average value.	Year.	Barrels.	Value.	Average value.
Fiscal Year.				Fiscal Year.			
1880.....	6,100	\$ 6,013	\$0.99	1898.....	12,850	\$ 9,002	\$0.70
1881.....	5,796	4,177	0.72	1899.....	15,720	11,124	0.71
1882.....	5,064	5,365	1.06	1900.....	12,865	11,211	0.87
1883.....	7,623	9,224	1.21	1901.....	19,657	14,534	0.74
1884.....	10,804	11,200	1.04	1902.....	24,602	17,584	0.71
1885.....	12,072	11,503	0.95	1903.....	31,108	22,470	0.72
1886.....	11,021	9,347	0.85	1904.....	54,359	39,639	0.73
1887.....	10,835	8,524	0.79	1905.....	98,676	71,588	0.73
1888.....	10,142	7,537	0.74	1906.....	134,334	93,630	0.70
1889.....	13,079	9,363	0.72	Calendar Year.			
1890.....	8,149	5,360	0.66	1907.....	126,285	99,179	0.79
1891.....	6,259	4,273	0.68	1908.....	143,270	99,196	0.69
1892.....	6,132	4,241	0.69	1909.....	168,357	118,239	0.70
1893.....	6,879	4,917	0.71	1910.....	212,502	138,847	0.65
1894.....	6,766	4,907	0.73	1911.....	228,538	161,985	0.71
1895.....	12,008	5,743	0.48	1912.....	329,925	207,481	0.63
1896.....	10,239	7,331	0.72	1913.....	386,693	238,271	0.62
1897.....	16,108	10,529	0.65	1914.....	340,828	211,123	0.62
				1915*.....	189,774	98,040	0.52

* Duty 20 per cent.

The Province of Ontario is the principal lime producing province having in recent years contributed from 30 to 42 per cent of the total output.

Statistics of the annual production of lime in Ontario, as published by the Ontario Bureau of Mines since 1896, are shown in the next table. For the years previous to 1910 these returns are slightly higher than those obtained by the Mines Branch.

Annual Production of Lime in Ontario.

(As ascertained by the Ontario Bureau of Mines.)

Calendar Year.	Bushels.	Value.	Average per bushel.	Calendar Year.	Bushels.	Value.	Average per bushel.
1896.	1,800,000	\$222,000	\$0.12	1906.	2,885,000	\$496,785	\$0.17
1897. ....	.....	.....	.....	1907.	2,650,000	418,700	0.17
1898.	2,620,000	308,000	0.12	1908.	2,442,331	448,596	0.18
1899.	4,342,500	535,000	0.12	1909.	2,633,500	470,858	0.18
1900.	3,893,000	544,000	0.14	1910.	2,889,235	474,531	0.16
1901.	4,100,000	550,000	0.13	1911.	2,469,773	402,340	0.16
1902.	4,300,000	617,000	0.14	1912.	2,297,525	381,672	0.17
1903.	3,400,000	520,000	0.15	1913.	2,300,991	390,600	0.17
1904.	2,600,000	406,800	0.16	1914.	2,075,228	333,407	0.16
1905.	3,100,000	424,700	0.14	1915.	1,340,394	244,953	0.18

* Preliminary.

SAND-LIME BRICK.

The first record of the production of sand-lime brick in Canada was obtained for the year 1907 when there was a production by ten firms amounting to 16,492,971 brick, valued at \$167,795.

In 1915 the sales were reported as 17,960,802 brick, valued at \$141,742, or an average of \$7.89 per thousand, as against sales in 1914 of 70,650,030 brick, valued at \$609,515, or an average of \$8.63 per thousand. In common with the clay brick industry a very large decrease in sales is shown. Sales were made very largely from stock since the total number of brick made during the year was reported as only 7,677,800, while stocks at the end of the year amounted to 9,347,000 brick.

Annual Production of Sand-Lime Brick.

Calendar Year.	No. of firms reporting.	Number sold.	Value.	Per M.
1907.....	10	16,492,971	\$ 167,795	\$10.17
1908.....	9	17,288,260	152,856	8.84
1909.....	9	27,052,864	201,650	7.45
1910.....	13	44,593,541	371,857	8.34
1911.....	16	51,535,243	442,427	8.58
1912.....	20	96,448,402	1,020,386	10.58
1913.....	22	92,586,676	906,665	9.79
1914.....	21	70,650,030	609,515	8.63
1915.....	18	17,960,802	141,742	7.89

SAND AND GRAVEL.

The production of sand and gravel in Canada during 1915, according to returns received by this office, amounted to 6,445,717 tons, valued at \$1,624,767, which shows a falling off in value of \$880,543, or 35 per cent as compared with the production reported for 1914.

The 1915 production included: building sand and sand for concrete and road building, etc., 1,169,756 tons, valued at \$440,619; gravel and crushed gravel, 186,825 tons, valued at \$100,972, sand and gravel, 1,151,584 tons, valued at \$490,163, railway ballast, 3,773,297 tons, valued at \$527,257; other sands, chiefly moulding sand, 164,255 tons, valued at \$65,756.

Previous to 1912, no attempt had been made by this department to obtain statistics of the production of building sand or of gravel in Canada. In 1912, however, a beginning was made, the returns received showing a production of sand and gravel valued at \$1,512,099.

For the year 1913 the collection was extended to include a record of the production of sand and gravel for railroad ballasting, but, at the time of closing the statistics, several important returns had not been received. However, the total value of the production as reported was \$2,258,874.

The total value of the production in 1914 as reported was \$2,505,310, but it is probable that the record was more complete than for the previous years which doubtless accounts in large measure for the increase in production shown.

Production of Sand and Gravel, 1915.

Province..	SAND.		SAND AND GRAVEL.		BALLAST.		ALL OTHER.		TOTAL.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
Nova Scotia.....	21,897	\$ 17,441	102,582	\$ 38,196	236,500	\$ 11,825	7,070	\$ 4,359	368,049	\$ 71,821
New Brunswick.....	2,450	1,445	4,220	1,631	316,522	15,938	.....	.....	323,192	19,014
Quebec.....	399,253	204,745	16,245	4,777	450,575	51,461	.....	.....	866,073	260,983
Ontario.....	675,208	189,538	522,466	195,303	1,684,902	282,015	150,807	60,570	3,033,383	727,426
Manitoba.....	29,135	10,537	239,987	140,114	214,772	52,745	350	270	484,244	203,666
Saskatchewan.....	11,944	10,568	24,450	17,893	75,525	9,745	.....	.....	111,919	38,206
Alberta.....	2,565	459	32,670	25,916	355,024	20,755	.....	.....	390,617	47,197
British Columbia.....	27,304	5,886	395,789	167,305	439,477	82,773	5,670	490	868,240	256,454
Total.....	1,169,756	440,619	1,338,409	591,135	3,773,297	527,257	164,255	65,756	6,445,717	1,624,767

Annual Production of Sand and Gravel, 1912-1914.

Province.	1912.	1913.	1914.
P. E. Island.....	\$ 13,549	\$ 101,201	\$ 100,016
Nova Scotia.....			
New Brunswick.....			
Quebec.....			
Ontario.....			
Manitoba.....			
Saskatchewan.....			
Alberta.....	243,126	638,778	370,713
British Columbia.....	363,668	638,771	833,635
	101,653	197,719	314,081
	255,453	236,377	222,019
	148,704	265,165	273,115
	385,946	180,863	391,731
Total.....	1,512,099	2,258,874	2,505,310

Statistics of the exports and imports of sand and gravel, are published in the annual reports of the Department of Customs, and the following tables are compiled from this record since 1893. During 1915 there were exported from Canada 808,022 tons of sand and gravel, valued at \$380,549; while, during the same year there were imported 199,597 tons, valued at \$120,756.

Annual Exports of Sand and Gravel.

Calendar Year.	Short Tons.	Value.	Average per ton.	Calendar Year.	Short Tons.	Value.	Average per ton.
1893.....	329,116	\$121,795	\$0.37	1904.....	399,809	\$129,803	\$0.32
1894.....	324,656	86,940	0.27	1905.....	306,935	152,805	0.50
1895.....	277,162	118,359	0.43	1906.....	336,550	139,712	0.41
1896.....	224,769	80,110	0.36	1907.....	298,095	119,853	0.40
1897.....	152,963	76,729	0.50	1908.....	298,954	161,387	0.54
1898.....	165,954	90,498	0.55	1909.....	481,584	256,166	0.53
1899.....	242,450	101,640	0.42	1910.....	624,824	407,974	0.65
1900.....	197,558	101,666	0.51	1911.....	573,494	408,110	0.71
1901.....	197,302	117,465	0.60	1912.....	660,090	459,952	0.70
1902.....	159,793	119,120	0.75	1913.....	644,633	440,956	0.68
1903.....	355,792	124,006	0.35	1914.....	952,370	802,358	0.84
				1915.....	808,022	380,549	0.47

Annual Imports of Sand and Gravel.

Fiscal Year.	Tons.	Value.	Average value.	Fiscal Year.	Tons.	Value.	Average value.
1893.....	26,065	\$ 31,739	\$1.22	1905.....	85,339	\$ 92,722	\$ 1.09
1894.....	41,573	33,506	0.81	1906.....	116,500	173,727	1.49
1895.....	19,609	24,779	1.26	Calendar Year.			
1896.....	18,953	24,604	1.30	1907.....	265,912	223,968	0.84
1897.....	21,308	25,222	1.18	1908.....	133,665	135,348	1.01
1898.....	32,148	43,287	1.35	1909.....	151,323	153,778	1.02
1899.....	30,288	42,209	1.39	1910.....	195,796	196,766	1.00
1900.....	35,713	41,280	1.16	1911.....	241,375	246,613	1.02
1901.....	35,749	42,891	1.20	1912.....	532,721	445,781	0.84
1902.....	47,381	58,668	1.24	1913.....	439,673	440,343	1.00
1903.....	91,518	95,647	1.05	1914.....	273,812	224,759	0.82
1904.....	110,634	107,547	0.97	1915.....	199,597	120,756	0.60

SLATE.

There is a small annual production of slate in Canada obtained from the New Rockland quarries, Melbourne township, Richmond county, and from quarries at Botsford in Temiscouata county, both operated by Messrs. Frazer and Davies.

The production in 1915 was 397 squares, valued at \$2,039, as compared with a production in 1914 of 1,075 squares, valued at \$4,837.

Annual Production of Slate.

Calendar Year.	Quantity	Value.	Calendar Year.	Quantity	Value.
1886*.....	5,345	\$ 64,675	1900.....		\$12,100
1887.....	7,357	89,000	1901.....		9,980
1888.....	5,314	90,689	1902.....		19,200
1889.....	6,935	119,160	1903*.....	5,510	22,040
1890.....	6,368	100,250	1904.....	5,277	23,247
1891.....	5,000	65,000	1905.....		21,568
1892.....	5,180	69,070	1906.....		24,446
1893.....	7,112	90,825	1907.....	4,335	20,056
1894.....		75,550	1908.....	2,950	13,496
1895.....		58,900	1909.....	4,000	19,000
1896.....		53,370	1910.....	3,959	18,492
1897.....		42,800	1911.....	1,833	8,248
1898.....		40,791	1912.....	1,894	8,939
1899.....		33,406	1913.....	1,432	6,444
			1914.....	1,075	4,837
			1915.....	397	2,039

* From 1903, in squares; previously, in tons.

No exports of slate have been reported since 1896 with the exception of the years 1908 and 1909.

The imports of slate during the past eight years ranged from \$100,000 to over \$200,000 per annum.

The total value of the imports during the calendar year 1915 was \$108,676, and included: roofing slate squares, valued at \$34,528, school writing slate \$38,874, slate pencils \$4,954, and other slates and manufactures of, \$30,320. The total value of the imports during the calendar year 1914, was \$213,256, and included: roofing slate squares valued at \$91,977; school writing slate \$54,723; slate pencils \$6,514; mantels \$598; and other slates and manufactures of \$59,444.

The imports of roofing slate, school writing slate, and manufactures of slate n.o.p., are chiefly from the United States. Some roofing slate is also imported from Great Britain, while slate pencils come chiefly from Germany and the United States.

Imports of Slate During the Years 1912, 1913, 1914, and 1915.

Slate and manufacture of.	1912.	1913.	1914.	1915.
Roofing slate.....	\$ 88,911	\$ 97,730	\$ 91,977	\$ 34,528
School writing slate.....	39,858	51,953	54,723	38,874
Slate pencils.....	6,978	9,166	6,514	4,954
Slate of all kinds and manufactures of.....	65,896	76,625	59,444	30,320
Mantels.....			598	
	200,643	235,474	213,256	108,676

Exports of Slate.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
1884.....	539	\$6,845	1893.....	178	\$3,168
1885.....	346	5,274	1894.....	187	3,610
1886.....	34	495	1895.....	36	574
1887.....	27	373	1896.....	301	8,913
1888.....	22	475	1897 to 1907.....	Nil.	Nil.
1889.....	26	3,303	1908.....		2,539
1890.....	12	153	1909.....	134	612
1891.....	15	195	1910 to 1915.....	Nil.	Nil.
1892.....	87	2,038			

Imports of Slate.

Fiscal Year.	Value.	Fiscal Year.	Value.	Year.	Value.
1880.....	\$21,431	1892.....	\$50,441	1904 Fiscal Year...	\$ 86,057
1881.....	22,184	1893.....	51,179	1905 " "...	93,228
1882.....	24,543	1894.....	29,267	1906 " "...	112,941
1883.....	24,968	1895.....	19,471	Calendar Year.	
1884.....	28,816	1896.....	24,176	1907.....	134,063
1885.....	28,169	1897.....	21,615	1908.....	120,282
1886.....	27,852	1898.....	24,907	1909.....	135,221
1887.....	27,845	1899.....	33,100	1910.....	142,285
1888.....	23,151	1900.....	53,707	1911.....	169,685
1889.....	41,370	1901.....	72,187	1912.....	200,643
1890.....	22,871	1902.....	72,601	1913.....	235,474
1891.....	46,104	1903.....	84,437	1914.....	213,256
				1915.....	108,676

STONE.¹

Statistics of stone production given herewith include the sales of all classes of stone used for building, monumental, and ornamental purposes, stone for paving purposes, curbstone, and flagstone, rubble, rip-rap, and crushed stone, limestone for furnace flux, sugar factories, etc., but stone used for burning lime or the manufacture of cement is not included.

The kinds of stone quarried have been classed as granite (including trap rock, syenite, and other igneous rocks), limestone, sandstone, and marble.

The records are practically confined to quarry operations and the production of sawn or polished stone when these operations are carried on by quarry operators. In addition to this production of stone by regular operators, there is no doubt a large stone production by individuals, such as farmers, and others, for house or barn foundations, concrete work, etc., of which it would be impracticable to obtain any satisfactory record. Much stone is also used in railway construction work and in road building, of which the record is probably very incomplete.

The total value of the production of stone in 1915 according to returns received was \$4,244,997, as compared with a value of \$5,469,056 in 1914, showing a falling off of \$1,224,059, or over 22 per cent.

The number of active firms reporting in 1915 was 236, the total number of men employed 5,144, and the total wages paid \$2,188,302. In 1914 the number of active firms reporting was 219, the number of men employed 5,929, and the total wages paid \$2,871,817.

Of the total value of the 1915 production, limestone contributed \$2,312,081, or 54.5 per cent, granite \$1,525,553, or 35.9 per cent, sandstone \$249,336, or 5.9 per cent, and marble \$158,027, or 3.7 per cent.

Stone was used for building purposes to the value of \$1,082,323, or 25.5 per cent of the total; monumental and ornamental to the value of \$150,030 or 3.5 per cent; curb, paving, and flagstone \$138,104, or 3.3 per cent; rubble 916,884 tons, valued at \$657,124, or 15.5 per cent; crushed stone 2,415,230 tons, valued at \$1,783,594, or 42.0 per cent, and furnace flux 814,854 tons, valued at \$433,822, or 10.2 per cent.

By provinces, Quebec again shows the largest output, having a value of \$1,966,194, or 46.3 per cent of the total; being made up of limestone to the value of \$1,189,633, granite valued at \$594,744, marble \$145,400 and sandstone \$36,417. Ontario takes second place with a production of

¹ A special investigation has been undertaken by the Mines Branch on the building and ornamental stones of Canada, by Prof. W. A. Parks, of Toronto University, and three reports of this series have been completed, as follows:—

No. 100. "The Building Stones of Canada, Vol. I." "Building and Ornamental Stones of Ontario."
No. 203. "Building Stones of Canada, Vol. II." "Building and Ornamental Stones of the Maritime Provinces."
No. 279. "Building Stones of Canada, Vol. III." "Building and Ornamental Stones of the Province of Quebec."

\$806,137, or 19 per cent of the total, of which limestone is credited with \$634,728, granite \$140,894, sandstone \$19,588, and marble \$10,927. British Columbia ranks third in order of importance with a total of \$796,876, including granite \$701,593, sandstone \$14,000, limestone \$79,583, and marble \$1,700. The Nova Scotia production was valued at \$367,924, comprising limestone \$255,024, granite \$79,636, and sandstone \$33,264. The production in Manitoba was valued at \$153,464, made up of limestone \$153,113, and granite \$351. New Brunswick is credited with \$153,512, made up chiefly of sandstone and granite.

Production of Stone by Provinces, 1915.

Province.	Granite.	Lime-stone.	Marble.	Sand-stone.	Total.	%	Labour.	
							No. men employed.	Wages.
Nova Scotia.....	\$ 79,636	\$ 255,024	.....	\$ 33,264	\$ 367,924	8.7	659	\$ 233,396
New Brunswick....	8,335	.....	.....	145,177	153,512	3.6	192	74,845
Quebec.....	594,744	1,189,633	\$145,400	36,417	1,966,194	46.3	2,638	1,045,280
Ontario.....	140,894	634,728	10,927	19,588	806,137	19.0	1,009	371,218
Manitoba.....	351	153,113	.....	.....	153,464	3.6	148	94,785
Alberta.....	.....	.....	.....	890	890	.....	8	700
British Columbia...	701,593	79,583	1,700	14,000	796,876	18.8	490	368,078
Total.....	1,525,553	2,312,081	158,027	249,336	4,244,997	.....	5,144	2,188,302
Per cent.....	35.9	54.5	3.7	5.9	.....	100.0	.....	.....

Production of Stone by Provinces, 1914.

Province.	Granite.	Lime-stone.	Marble.	Sand-stone.	Total.	%	Labour.	
							No. men employed.	Wages.
Nova Scotia.....	\$ 65,727	\$ 94,239	.....	\$ 61,124	\$ 221,090	4.1	441	\$ 120,944
New Brunswick....	24,525	.....	.....	236,647	261,172	4.8	277	156,619
Quebec.....	842,845	1,326,943	\$ 98,890	17,400	2,286,078	41.8	2,400	1,145,873
Ontario.....	309,720	853,906	30,300	59,923	1,253,849	22.9	1,575	645,728
Manitoba.....	15,654	346,258	.....	.....	361,912	6.6	373	190,241
Alberta.....	.....	.....	.....	60,272	60,272	1.1	78	46,943
British Columbia...	918,131	51,435	3,343	51,774	1,024,683	18.7	785	565,469
Total.....	2,176,602	2,672,781	132,533	487,140	5,469,056	.....	5,929	2,871,817
Per cent.....	39.8	48.9	2.4	8.9	.....	100.0	.....	.....

Production of Stone by Kinds and by Provinces Showing Purposes Used, 1915.

By kinds.	Building.	Ornamental and monumental.	Paving and curbstone.	RUBBLE.		CRUSHED.		FURNACE FLUX.		Total Value.
				Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.	
Granite.....	\$ 487,599	\$ 80,377	\$ 88,474	569,410	\$407,842	541,811	\$ 461,261	.....	.....	\$1,525,553
Limestone.....	400,017	68,973	27,539	155,961	102,250	1,828,365	1,279,480	.....	433,822	2,312,081
Marble.....	143,321	.....	.....	.....	.....	25,039	14,706	.....	.....	158,027
Sandstone.....	51,386	680	22,091	191,513	147,032	20,015	28,147	.....	.....	249,336
By Provinces.										
Nova Scotia.....	16,464	18,700	4,531	43,064	23,846	77,941	52,633	481,346	251,750	367,924
New Brunswick.....	24,475	8,080	935	144,343	120,022	.....	.....	.....	.....	153,512
Quebec.....	566,693	116,599	102,635	98,044	75,427	1,272,934	1,104,730	.....	110	1,966,194
Ontario.....	84,580	5,151	29,503	65,782	34,842	937,072	546,193	176,021	105,868	806,137
Manitoba.....	118,028	.....	.....	19,871	14,592	31,845	20,844	.....	.....	153,464
Alberta.....	390	.....	500	.....	.....	95,738	59,194	.....	.....	796,876
British Columbia.....	271,693	1,500	.....	545,780	388,395	.....	.....	157,377	76,094	.....
Total.....	1,082,323	150,030	138,104	916,884	657,124	2,415,230	1,783,594	814,854	433,822	4,244,997
Per cent.....	25.5	3.5	3.3	.....	15.5	.....	42.0	.....	10.2	100.0

Value of Stone for Various Purposes in 1914.

Kind.	Building.	Orna- mental and monu- mental.	Paving and curb- stone.	Rubble.	Crushed.	Furnace flux.	Total.
Granite.....	\$ 496,261	\$ 93,948	\$138,443	\$ 793,736	\$ 654,214	.....	\$2,176,602
Limestone.....	876,544	13,504	55,420	241,698	1,255,742	\$229,873	2,672,781
Marble.....	33,643	93,386	.....	2,614	2,890	.....	132,533
Sandstone.....	226,315	510	23,715	198,109	38,491	.....	487,140
Total.....	1,632,763	201,348	217,578	1,236,157	1,951,337	229,873	5,469,056

Production of Stone by Provinces and for Purposes Used, 1914.

Province.	Building.	Orna- mental and monu- mental.	Paving and curb- stone.	Rubble.	Crushed.	Furnace flux.	Total.
Nova Scotia.....	\$ 78,504	\$ 20,964	\$ 2,649	\$ 22,083	\$ 2,651	\$ 94,239	\$ 221,090
New Brunswick.....	52,287	13,983	10,702	184,200	.....	261,172	.....
Quebec.....	916,978	154,012	97,895	112,655	994,637	9,901	2,286,078
Ontario.....	153,871	12,089	100,332	180,272	859,085	74,298	1,253,849
Manitoba.....	230,160	.....	.....	.....	16,654	.....	361,912
Alberta.....	59,572	.....	.....	700	.....	60,272	.....
British Columbia.....	151,391	300	6,000	736,247	79,310	51,435	1,024,683
Total.....	1,632,763	201,348	217,578	1,236,157	1,951,337	229,873	5,469,056
Per cent.....	29.8	3.7	4.0	22.6	35.7	4.2	100.0

Exports and Imports.—The exports of stone from Canada in 1915 were valued at \$72,777, as against \$72,080 in 1914, and \$93,840 in 1913. The principal item in the export of stone during the past few years has been building stone, unwrought, of which the exports in 1915 were 35,804 tons, valued at \$28,910. There was also an export of ornamental granite, marble, etc., unwrought, of 29,976 tons, valued at \$12,764; crushed stone 42,716 tons, valued at \$24,453, and dressed stone, including both ornamental and building, valued at \$6,650.

The exports of the several classes of stone during the past three years as shown by the Customs record, were as follows:—

Exports of Stone During the Calendar Years 1913, 1914, 1915.

	1913.		1914.		1915.	
	Short Tons.	Value.	Short Tons.	Value.	Short Tons.	Value.
Stone—						
Crushed.....	4,814	\$ 3,126	25,130	\$18,153	42,716	\$24,453
Ornamental, granite, marble, etc., unwrought.....	1,942	687	231	5,607	29,976	12,764
Building, freestone, limestone, etc., unwrought.....	191,981	82,646	63,009	46,198	35,804	28,910
Ornamental, granite, marble, etc., dressed.....	.....	7,381	.....	1,752	.....	5,990
Building, freestone, limestone, etc., dressed.....	.....	0	.....	370	.....	660
.....	.....	93,840	.....	72,080	.....	72,777

Exports of Stone and Marble, Wrought and Unwrought.

Calendar Year.	Wrought.	Unwrought.	Calendar Year.	Wrought.	Unwrought.
1890.....	\$21,725	\$ 43,611	1903.....	\$ 7,684	\$46,295
1891.....	13,398	46,162	1904.....	4,760	17,802
1892.....	7,698	47,424	1905.....	3,545	13,089
1893.....	9,102	12,532	1906.....	23,097	4,675
1894.....	22,576	34,130	1907.....	4,233	3,087
1895.....	8,587	51,616	1908.....	15,194	36,820
1896.....	4,934	32,897	1909.....	33,598	24,087
1897.....	9,415	42,034	1910.....	5,352	22,219
1898.....	2,526	65,370	1911.....	1,436	26,899
1899.....	5,092	101,931	1912.....	2,621	30,621
1900.....	5,933	115,711	1913.....	7,381	86,459
1901.....	5,917	157,739	1914.....	2,122	69,958
1902.....	8,632	124,829	1915.....	6,650	66,127

The imports of stone are classified as: building stone of all kinds, except marble; manufactures of granite and other stone; and marble and its manufactures. The total value of the imports during the calendar year 1915 was \$539,173, as compared with a value of \$1,252,869 in 1914, showing a decrease of \$713,696, or 57 per cent. The imports during 1915 comprised: building stone (rough) valued at \$54,249; building stone (dressed) \$57,761; granite and manufactures of granite \$179,604; paving blocks \$584; marble and manufactures of \$152,454; and refuse stone 269,912 tons, valued at \$94,521.

The total value of the imports from the United States in 1915 was \$401,612; Great Britain \$136,153; Italy \$483; and from other countries \$925.

The imports during 1914 comprised: building stone (rough), valued at \$72,147, building stone (dressed) \$252,563; granite and manufactures of granite \$235,587; paving blocks \$4,428; marble and manufactures of, \$465,563; and refuse stone 416,816 tons, valued at \$222,581.

The total value of the imports from United States in 1914 was \$909,618; Great Britain \$202,055; Italy \$37,610; and from other countries \$103,586.

During both years the imports were derived chiefly from the United States and Great Britain, the United States supplying building stone, paving blocks, marble, and refuse stone, principally; and Great Britain mainly manufactures of granite. Marble was obtained also in small quantities from Italy and other countries.

Total Imports of Stone During the Calendar Years 1914 and 1915.

Imports.	1914.		1915.	
	Short Tons.	Value.	Short Tons.	Value.
Building stone, rough ¹		\$ 72,147		\$ 54,249
Building stone dressed ¹		252,563		57,761
Refuse stone ¹	416,816	222,581	269,912	94,521
Granite, sawn only.....		5,346		2,350
Granite, manufactures of.....		196,622		141,831
Paving blocks.....		4,428		584
Manufactures of stone, n.o.p.....		33,619		35,423
Marble and manufactures of—				
Marble, sawn or sand rubbed, not polished.....		204,863		86,640
Marble, rough, not hammered or chiselled.....		115,339		24,801
Marble, manufactures of, n.o.p.....		145,361		41,013
		1,252,869		539,173

¹ Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

² Flagstone and all other building stone, sawn, or dressed, or partially dressed.

³ Stone refuse not sawn, hammered, or chiselled, not fit for flagstone, building stone, or paving.

Imports of Stone, Showing Country of Origin, Calendar Year 1915.

Imports.	Great Britain.		United States.		Italy.	Other countries.
	Short Tons.	Value.	Short Tons.	Value.	Value.	Value.
Building stone, rough ¹		\$ 43		\$ 54,206		
Building stone, dressed ²		126		57,635		
Refuse stone.....			269,872	94,490		\$ 31
Granite, sawn only.....		151		2,199		
Granite, manufactures of.....		129,971		11,860		
Paving blocks.....				584		
Manufactures of stone, n.o.p.....		2,717		32,488		218
Marble and manufactures of—						
Marble, sawn or sand rubbed, not polished.....		2		86,638		
Marble rough, not hammered or chiselled.....				24,274	\$149	378
Marble, manufactures of, n.o.p.....		3,143		37,238	334	298
Total.....		136,153		401,612	483	925

¹ Flagstone, granite, rough sandstone, and all building stone not hammered, sawn, or chiselled.

² Flagstone; all other building stone, sawn, or dressed.

Annual Imports of Stone.

	BUILDING STONE.		Manufactures of granite, etc., Paving blocks.	Marble.	Flagstone.*	Total value.
	Rough.	Dressed.				
Fiscal Year.						
1880.....	\$ 32,824	\$ 3,146	\$ 29,408	\$ 63,015	.....	\$ 128,393
1881.....	7,823	50,326	36,877	85,977	\$ 241	181,244
1882.....	32,848	775	37,267	109,505	848	181,243
1883.....	33,429	1,632	45,636	128,520	99	209,316
1884.....	46,232	4,856	45,290	108,771	1,158	206,307
1885.....	28,433	2,058	39,867	102,835	1,756	174,949
1886.....	36,776	4,899	41,984	117,752	9,443	210,854
1887.....	47,819	6,549	41,829	104,250	10,966	211,413
1888.....	84,263	2,110	47,487	94,681	21,077	249,618
1889.....	89,723	10,591	61,341	118,421	15,451	295,527
1890.....	126,456	5,699	84,396	99,353	48,995	364,899
1891.....	151,119	19,771	61,051	107,661	36,348	372,950
1892.....	85,169	10,381	39,479	106,268	15,048	256,345
1893.....	47,609	8,901	49,323	96,177	8,500	210,510
1894.....	48,097	4,811	49,510	94,657	2,429	199,504
1895.....	37,732	6,550	51,050	83,422	84	178,838
1896.....	42,737	-11,393	51,499	90,065	Nil.	195,694
1897.....	27,442	11,272	34,026	77,150	227	150,117
1898.....	25,322	3,173	41,240	95,894	1,540	167,129
1899.....	43,494	4,546	60,148	104,879	Nil.	210,067
1900.....	63,376	1,157	57,039	94,017	63	215,652
1901.....	45,039	1,039	66,639	96,159	116	208,992
1902.....	69,972	29,102	72,397	130,424	1,231	303,126
1903.....	71,202	16,664	78,629	153,481	.....	319,976
1904.....	59,864	33,914	141,165	181,511	.....	416,454
1905.....	49,004	53,813	150,160	145,466	.....	398,443
1906.....	66,994	65,134	178,435	189,589	Refuse Stone.†	500,152
Calendar Year.						
1907.....	73,140	85,683	161,250	254,897	79,371	654,341
1908.....	64,607	72,575	196,717	245,448	34,746	614,093
1909.....	102,470	178,087	221,097	182,147	54,428	738,229
1910.....	125,531	186,064	266,313	267,215	.....	845,123
1911.....	85,084	307,784	272,512	384,252	91,214	1,140,846
1912.....	117,037	451,635	309,386	475,926	113,159	1,467,143
1913.....	105,576	464,540	302,398	577,028	191,307	1,640,849
1914.....	72,147	252,563	240,015	465,563	222,581	1,252,869
1915.....	54,249	57,761	180,188	152,454	94,521	539,173

* Included in building stone since 1903.

† Not shown separately previous to Nov. 29, 1906.

GRANITE.

The production of granite, including trap-rock, syenite, etc., in 1915, according to returns received from 69 active firms reporting, was valued at \$1,525,553, as compared with a production in 1914 by 69 firms, valued at \$2,176,602, showing a decreased production in 1915 of 651,049, or 30 per cent.

The largest production is reported from British Columbia in 1915, the value being \$701,593, as against \$918,131 in 1914. The value of the production in Quebec was \$594,744, as against \$842,845, in 1914. Ontario produced granite to the value of \$140,894 in 1915, as compared with \$309,720 in 1914. Much of the rough stone quarried in New Brunswick, as well as stone imported from Redbeach, Maine, and Mt. Johnson, Que., is worked up into finished ornamental and monumental stone in mills at St. George, N.B. The value of the finished stone produced at St. George in 1915 was \$95,993, as against a value of \$90,840 produced in 1914.

Value of Granite Production by Provinces, 1915.

Province.	Building.	'Monu- mental or orna- mental.	Curb, or paving.	Rubble and Riprap.		Crushed.		Total.
				Short Tons.	Value.	Short Tons.	Value.	
Nova Scotia.	\$ 6,300	\$18,700	\$ 4,531	1,064	\$ 746	73,121	\$ 49,359	\$ 79,636
New Brun- swick.....	(2) 7,400	935	.....	.....	.....	.....	.....	8,335
Quebec.....	223,418	51,599	58,942	17,675	15,586	252,954	245,199	594,744
Ontario.....	1,888	1,178	24,066	4,891	3,115	126,780	110,647	140,894
Manitoba.....	.....	.....	.....	.....	.....	195	351	351
British Columbia...	255,993	1,500	.....	545,780	388,395	88,761	55,705	701,593
Total...	487,599	80,377	88,474	569,410	407,842	541,811	461,261	1,525,553

(2) Finished stone was produced at St. George to the value of \$95,993.

Value of Granite Production by Provinces, 1914.

Province.	Building.	Monu- mental or orna- mental.	Curb or paving.	Rubble.	Crushed.	Total.
Nova Scotia.....	\$ 26,324	\$20,614	\$ 2,649	\$ 13,940	\$ 2,200	\$ 65,727
New Brunswick.....	.....	*13,823	10,702	.....	.....	24,525
Quebec.....	370,403	57,626	45,052	12,809	356,955	842,845
Ontario.....	3,260	1,585	74,040	30,740	200,095	309,720
Manitoba.....	.....	.....	.....	.....	15,654	15,654
British Columbia.....	96,274	300	6,000	736,247	79,310	918,131
Total.....	496,261	93,948	138,443	793,736	654,214	2,176,602

* Finished stone in 1914 was valued at \$90,840.

Annual Production of Granite.

Calendar Year.	Short Tons.	Value.	Calendar Year.	Value.
1886.....	6,062	\$ 63,309	1901.....	\$ 155,000
1887.....	21,217	142,506	1902.....	210,000
1888.....	21,352	147,305	1903.....	200,000
1889.....	10,197	79,624	1904.....	150,000
1890.....	13,307	65,985	1905.....	226,305
1891.....	13,637	70,056	1906.....	278,419
1892.....	24,302	89,326	1907.....	194,712
1893.....	22,521	94,393	1908.....	282,320
1894.....	16,392	109,936	1909.....	454,824
1895.....	19,238	84,838	1910.....	739,516
1896.....	18,717	106,709	1911.....	1,119,865
1897.....	19,345	61,934	1912.....	1,373,119
1898.....	23,897	81,073	1913.....	1,653,791
1899.....	13,418	90,542	1914.....	2,176,602
1900.....	.....	80,000	1915.....	1,525,553

LIMESTONE.

The statistics given herewith do not include the value of the stone burned into lime by the quarry operators, nor that of the stone used in the manufacture of cement, a record of lime and cement production being separately given. With this exception, the total value of limestone produced in Canada in 1915 was \$2,312,081, as compared with the value of \$2,672,781 in 1914, showing a slight decrease.

The production during 1915 of limestone for building purposes was valued at \$468,990, as against \$890,048 in 1914. The production of curbstone and paving stone was valued at \$27,539, as against \$55,420 in 1914. The production of rubble and riprap was 155,961 tons, valued at \$102,250, as against a value of \$241,698 in 1914. The production of crushed stone was 1,828,365 tons, valued at \$1,279,480, as against a value of \$1,255,742 in 1914. The production of furnace flux was 814,854 tons, valued at \$433,822, as against 427,966 tons, valued at \$229,873 in 1914.

Limestone Production by Provinces, 1915.

Province.	Building and ornamental.	Curbstone and paving stone.	Rubble and riprap.		Crushed.		Furnace flux.		Total Value.
			Short tons.	Value.	Short tons.	Value.	Short tons.	Value.	
Nova Scotia.....					4,820	\$ 3,274	481,346	\$251,750	\$ 255,024
Quebec.....	\$277,581	\$25,693	80,369	\$ 59,841	981,535	826,408	110	110	1,189,633
Ontario.....	73,381	1,846	55,721	27,817	803,683	425,816	176,021	105,868	634,728
Manitoba.....	118,028		19,871	14,592	31,350	20,493			153,113
British Columbia.....					6,977	3,489	157,377	76,094	79,583
Total.....	468,990	27,539	155,961	102,250	1,828,365	1,279,480	814,854	433,822	2,312,081

Value of Limestone Production by Provinces, 1914.

Province.	Building and ornamental.	Crushed.	Curbstone and paving.	Rubble.	Furnace flux.		Total Value.
					Short tons.	Value.	
Nova Scotia.....					176,817	\$ 94,239	\$ 94,239
Quebec.....	\$549,575	\$ 617,392	\$52,843	\$ 97,232	13,467	9,901	1,326,943
Ontario.....	120,313	563,363	2,577	93,355	116,468	74,298	853,906
Manitoba.....	220,160	74,987		51,111			346,258
British Columbia.....					121,214	51,435	51,435
Total.....	890,048	1,255,742	55,420	241,698	427,966	229,873	2,672,781

Production of Limestone by Provinces, 1909-1913.

Province.	1909.	1910.	1911.	1912.	1913.
Nova Scotia.....	\$ 161,922	\$ 192,919	\$ 245,216	\$ 275,944	\$ 258,719
New Brunswick.....	30	315	110		
Quebec.....	972,253	962,429	1,296,577	1,187,751	1,307,428
Ontario.....	639,674	722,763	680,461	862,052	1,196,130
Manitoba.....	328,554	328,029	315,782	381,572	382,984
Alberta.....					20,000
British Columbia.....	37,258	43,121	56,780	55,617	38,830
Total.....	2,139,681	2,249,576	2,594,926	2,762,936	3,204,091

MARBLE.

From 1886 to 1896 there was a small production of marble, aggregating, however, only \$45,837 in value for the eleven years. During the next eleven years—1897 to 1907—there is no record of any production. But the opening up of the quarries at Philipsburg and South Stukely, Que., together with the development of quarries in Ontario and British Columbia, has resulted in a considerable production of marble during the past seven years. The total value of the production in 1915 was returned as \$158,027, as compared with \$132,533 in 1914, \$249,975 in 1913, and \$260,764 in 1912.

Marble quarries were operated during 1915 at Philipsburg, Que., Dungannon, Faraday, and Ross townships, Ont., and Marble Head, B.C.

Annual Production of Marble.

Calendar Year.	Short Tons.	Value.	Calendar Year.	Short Tons.	Value.
1886.....	501	\$ 9,900	1896.....	224	\$ 2,405
1887.....	242	6,224	1897 to 1907 inclusive.	Nil.	Nil.
1888.....	191	3,100	1908.....		125,000
1889.....	83	980	1909.....		158,441
1890.....	780	10,776	1910.....		158,779
1891.....	240	1,752	1911.....		162,783
1892.....	240	3,600	1912.....		260,764
1893.....	590	5,100	1913.....		249,975
1894.....	Nil.	Nil.	1914.....		132,533
1895.....	200	2,000	1915.....		158,027

The imports of marble during the calendar year 1915 were valued at \$152,454, as compared with \$465,563 in 1914, \$577,028 in 1913, and \$475,926 in 1912.

The annual imports of marbles since 1880 are shown in the general table of imports, page 360.

SANDSTONE.

The value of the production of sandstone in 1915 is reported as \$249,336, as compared with a value of \$487,140, reported for 1914. The greater part of the sandstone is quarried for building purposes, though large quantities were used for rubble and paving purposes.

Of the production in 1915, building and ornamental stone were sold to the value of \$52,066, this amount, including rough stone valued at \$40,401, and dressed stone valued at \$11,665. The production of rubble and riprap in 1915 was 191,531 tons, valued at \$147,032, and of crushed stone 20,015 tons, valued at \$28,147.

Of the production in 1914, building and ornamental stone was sold to the value of \$226,825, or 47 per cent of the total value of production. There was included in this amount, rough stone valued at \$108,606, and dressed stone valued at \$118,219.

Value of Sandstone Production by Provinces, 1915.

Province.	Building and ornamental	Paving	Rubble and Riprap.		Crushed.		Total Value.
			Short tons.	Value.	Short tons.	Value.	
Nova Scotia.....	\$10,164	.....	42,000	\$ 23,100	.....	.....	\$ 33,264
New Brunswick.....	25,155	.....	144,343	120,022	.....	.....	145,177
Quebec.....	\$18,000	.....	.....	.....	13,406	\$18,417	36,417
Ontario.....	2,357	3,591	5,170	3,910	6,609	9,730	19,588
Alberta.....	390	500	.....	.....	.....	.....	890
British Columbia.....	14,000	.....	.....	.....	.....	.....	14,000
Total.....	52,066	22,091	191,513	147,032	20,015	28,147	249,336

Value of Sandstone Production by Provinces, 1914.

Province.	Building and ornamental.	Crushed.	Paving.	Rubble.	Total.
Nova Scotia.....	\$ 52,530	\$ 451	.....	\$ 8,143	\$ 61,124
New Brunswick.....	52,447	.....	.....	184,200	236,647
Quebec.....	.....	17,400	.....	.....	17,400
Ontario.....	10,502	20,640	\$23,715	5,066	59,923
Alberta.....	59,572	.....	.....	700	60,272
British Columbia.....	51,774	.....	.....	.....	51,774
Total.....	226,825	38,491	23,715	198,109	487,140

Value of Sandstone Production by Provinces 1909-1913.

Province.	1909.	1910.	1911.	1912.	1913.
Nova Scotia.....	\$ 21,850	\$ 16,425	\$ 23,440	\$ 20,645	\$ 62,490
New Brunswick.....	30,609	51,793	35,337	68,260	70,787
Quebec.....	.....	.....	450	.....	.....
Ontario.....	62,824	62,247	54,032	59,240	54,738
Alberta.....	90,383	240,858	158,344	81,391	136,984
British Columbia.....	168,513	130,825	179,580	99,816	71,783
Total.....	374,179	502,148	451,183	329,352	396,782

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